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CLEVELAND'S SEWAGE TESTING STATION

Description Apparatus and Methods Employed in Obtaining Data for Design—Grit Chambers, Sedimentation, Septic, Imhoff and Other Tanks, Screens, Filters, Sludge Beds and Disinfection—Trade Wastes—Sludge Disposal.

By R. WINTHROP PRATT* and H. H. WAGENHALS.†

The city of Cleveland has been operating, for the last eighteen months, a sewage testing station located near the mouth of the main outfall sewer on the lake shore eight miles northeast of the centre of the city. This main sewer receives somewhat more than 50 per cent of the total sewage of the city and the average dry weather flow is slightly less than 60 million gallons per day.

In connection with the investigations at the testing station relative to the treatment of the sewage from the main sewer, work has also been done by the testing station corps relative to the quality of the sewage being discharged into the lake and river from the westerly and southerly portions of the city. In addition, survey has been made relative to the manufacturing wastes from the principal factories in Cleveland.

In the operation of the testing station every effort was made to establish conditions similar to those which have to be met at a final disposal plant. A fixed percentage of the flow in the main sewer was treated continuously. A gauge in the present settling basin of the main sewer recorded the flow as measured by the head over the weir at the outlet. This gauge was read every hour, day and night, and the volume of sewage taken for treatment was regulated in accordance with these readings. In this way the hourly variations in the main sewer were paralleled with hourly variations throughout the plant, so that the weak night sewage and strong day sewage were treated in proportion to their respective volumes. Of course, during severe storms when the sewer was flowing at rate of 200 million gallons or more, this schedule could not be followed exactly, but the occurrence of such conditions were so rare that they did not interfere with the results.

DESCRIPTION OF PLANT.

The general scheme was to pass the sewage through coarse screens and grit chambers, and from these through tanks Nos. 3, 4, 5, 6, 7, 8, 9 and 10. Effluents from the tanks were treated in various ways—passed through plain sedimentation tanks Nos. 11 and 12, dilution tanks Nos. 13 and 14, rapid and sprinkling filters, fine screen, and subjected to disinfection treatment. The greater part of the plant and the greater variety of experiments were devoted to tank treatment.

The sewage was pumped from the inlet of the settling basin by either a 6-inch or a 5-inch centrifugal pump; the 6-inch pump was of the vertical type, driven by a 15 h. p. motor to which it was connected with a quarter turned belt by an extended pump shaft 12 feet above the pump. The 5-inch pump was of the horizontal type, direct connected to a 30 h. p. motor set upon the same base. Each motor received current from a different source so that if one failed the operation of the plant would not be interfered with. Each pump had a capacity of about 1,000,000 gallons per day and lifted the sewage a vertical distance of 15 feet to the grit chamber.

Grit Chamber.—This was originally divided into two units, each of which was 5x25 feet in plan and 5 feet deep at the inlet end, sloping to 3 feet at the outlet end. It was found that sufficient velocity could not be obtained in such large chambers and that putrescible organic matter was being deposited. The areas of the sections were, therefore, diminished by placing a false bottom, reducing the depth by 2 feet for the whole length of the chamber so that the depth at the inlet was 3 feet and at the outlet one foot. Two longitudinal partitions were also placed in each chamber, dividing it into three equal sections. During the test other changes were made. One of the smaller compartments was again subdivided by a longitudinal partition into two sections, each having a width of 8 inches, to study the effect of a still greater velocity. Also, in order to study the detention period, one of the grit chambers was remodeled to be operated as a 75-foot chamber by passing the sewage back and forth through the three compartments. Finally, to obtain a constant velocity for constant flows, the grit chamber was again remodeled, having for its bottom movable vanes with a slot for the removal of the deposited grit. This prevented the area of the cross section being changed by the grit that was deposited.

A by-pass was built around the grit chamber to be used in times of dry weather flow, when it was anticipated that the grit chambers would be unnecessary, but it was found that grit was deposited at all times and the grit chambers were, therefore, operated continuously.

The volume of sewage passing through the grit chambers was measured by an 18-inch weir at the outlet and was controlled by a relief valve in the force main which could be regulated to waste the sewage which was pumped in excess of the volume required.

Three-inch square edge lumber was used in the construction of the grit chamber and it was bound together by ⅜-inch steel rods placed 2 feet c. to c. running vertically through the sides and by ½-inch steel rods running horizontally through the bottom. This gave a tight construction and no trouble was experienced with leakage.

The sewage was conveyed from the outlet of the grit chamber to the various preliminary treatment devices by means of a system of open wooden flumes and cast iron pipes. The main flume extended across the inlet ends of tanks Nos. 5, 6 and 7 and served as quieting

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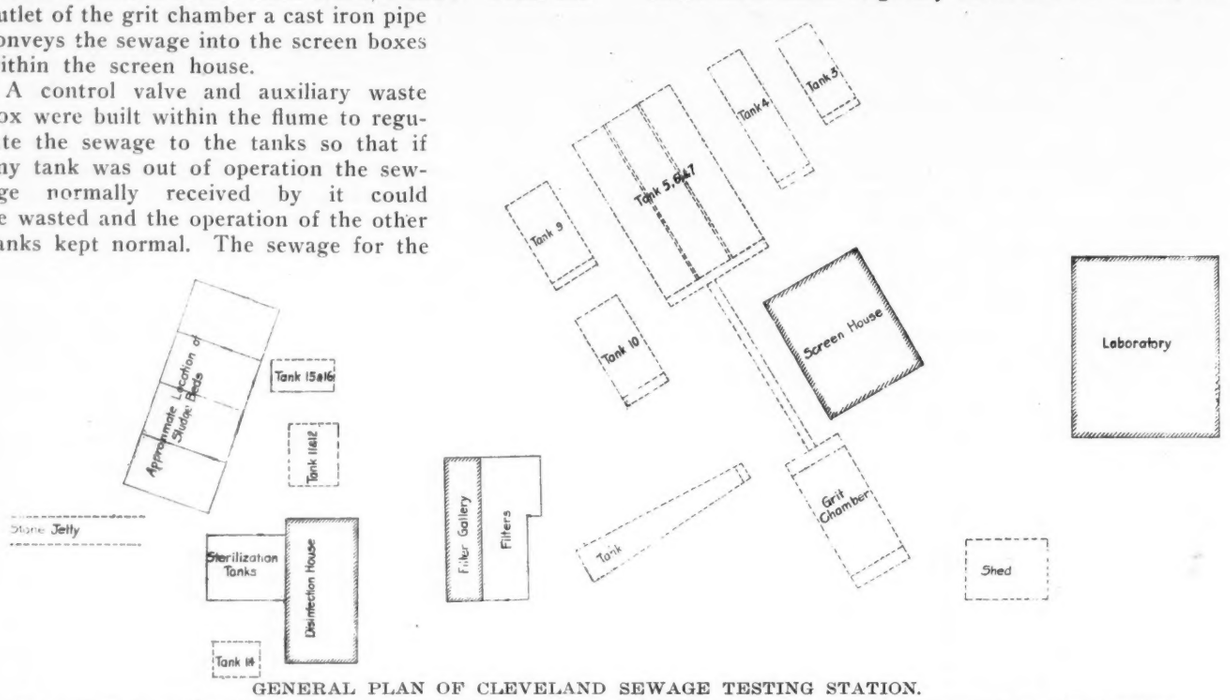
boxes for these tanks. Smaller flumes led from this section of the flume to tanks Nos. 4 and 9, and tank No. 3 also received its sewage from this section by a cast iron pipe. The sewage for tank No. 8 was taken by a cast iron pipe directly at the outlet of the grit chamber and tank No. 10 received its sewage through a wooden trough tapping the main flume above the point where it widens to extend across tanks No. 5, 6 and 7. From the outlet of the grit chamber a cast iron pipe conveys the sewage into the screen boxes within the screen house.

A control valve and auxiliary waste box were built within the flume to regulate the sewage to the tanks so that if any tank was out of operation the sewage normally received by it could be wasted and the operation of the other tanks kept normal. The sewage for the various tanks was measured over weirs, all of which were set at the same level, and it was by adjusting the length of these weirs and the head over them that the volume of sewage treated in the respective tanks was varied according to the schedule as described above. The effluents from the tanks were led to the filters or to the disinfection house, or wasted directly into the creek.



GENERAL PLAN OF CLEVELAND SEWAGE TESTING STATION.

Tank 13 is immediately adjacent to tank 14. The dotted and full lines indicate separate contracts for construction.

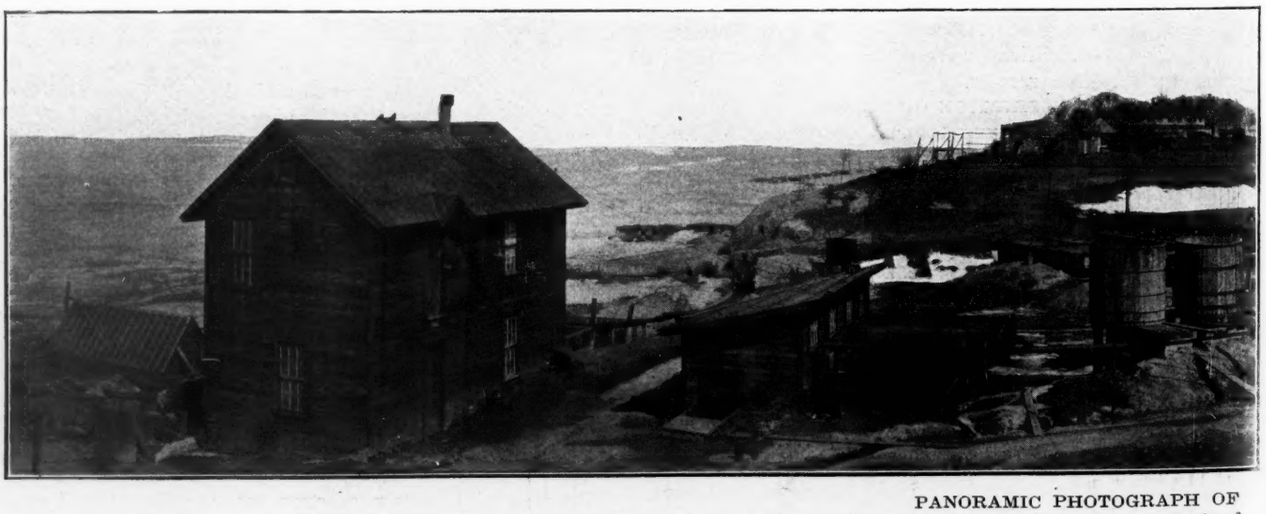
Sedimentation Tanks.—Tank No. 3 was 7x20 feet in plan and 25 feet deep from flow line to bottom of hoppers, and contained two concrete hoppers each 9x6 feet in plan and 5 feet 6 inches deep.

Tank No. 4 was 7x30 feet in plan and 15 feet deep from flow line to bottom of hoppers, and also contained two concrete hoppers each 6x30 feet in plan and 2 feet 8 inches deep.

Tank No. 5 was 8x40 feet in plan and 8 feet deep at the inlet, sloping to 9 feet at the outlet. There were no hoppers in this tank, the bottom being flat and of wooden construction, and the sludge drain passed directly through the tank at the outlet end.

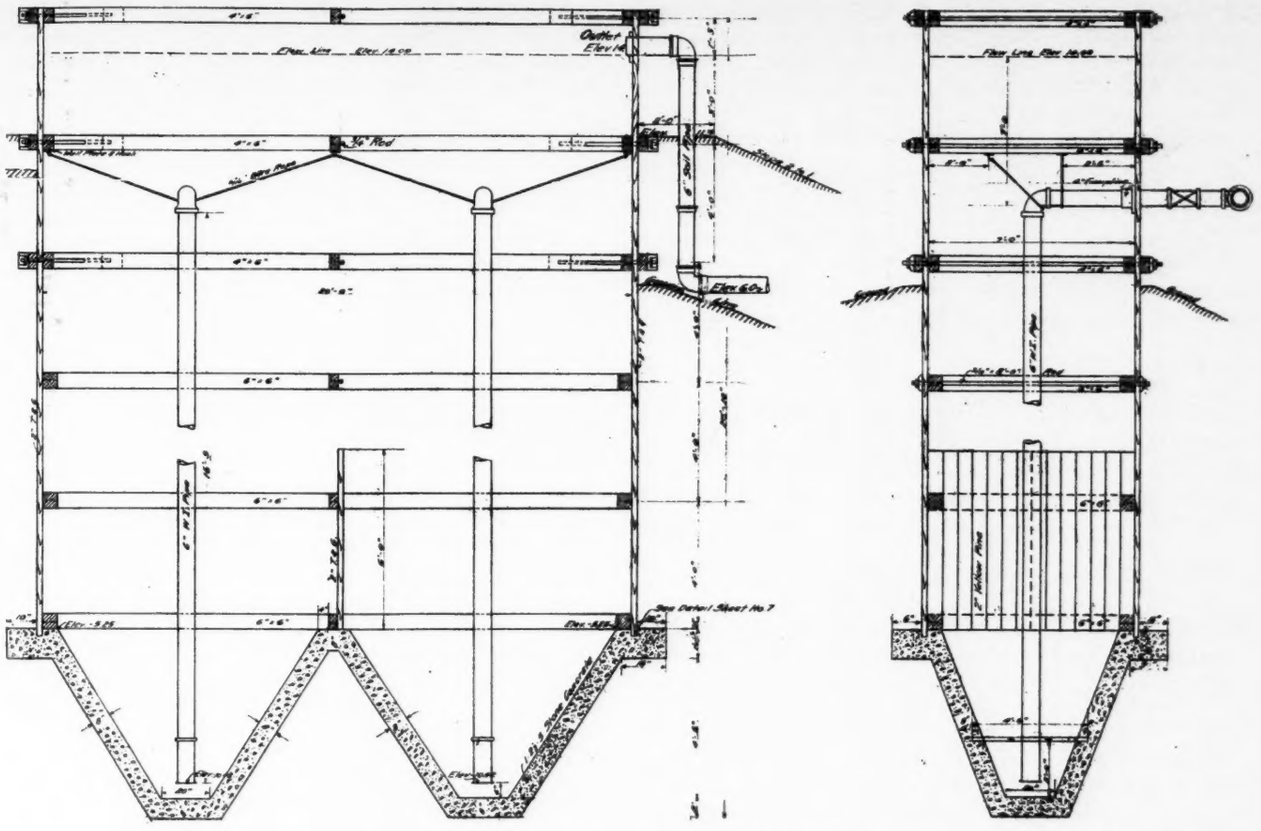
These three tanks originally contained no baffles, but shortly after the beginning of the tests inlet and outlet baffles were placed in each of them. Sludge was removed from tanks Nos. 3 and 4 by sludge drains extending to within 6 inches of the bottom of the hoppers and passing out of the tank about 8 feet below the flow line. These three tanks were operated as plain or horizontal flow sedimentation tanks during the early part of the tests, from January through May. On the basis of total displacement, the computed detention period of these three tanks was three, three and eight hours respectively, but the actual detention period as determined by dyes fell short of these figures.

Tank No. 3 was remodeled and operated for a short



PANORAMIC PHOTOGRAPH OF

(The same elevated wooden tanks appear in both sections of the picture.) The city owns and controls land.



LONGITUDINAL AND CROSS SECTIONS OF TANK NO. 3.

time as a vertical flow sedimentation or Dortmund tank. It was divided by a transverse partition into two equal sections, and sewage was introduced into each of these sections at a point 12 feet below the flow line by means of wooden chutes. The sewage was removed from the tank by two series of troughs which skimmed it from the surface. No baffles were placed in this tank when it was being operated as a Dortmund tank.

Tank No. 4 was remodeled in June into a single flow chamber Imhoff tank. This flow chamber was shallow, being but one foot deep at the gas vent on one side and sloping to one foot 10 inches deep at the trap on the other side. It was lined with tin to make it absolutely gas-tight.

Tank No. 5 was remodeled during May into an Imhoff tank with two flow chambers separated by a gas vent. Each flow chamber was 2 inches deep below the flow line at the center of the tank and 4 feet 2 inches at the sides, where it was trapped.

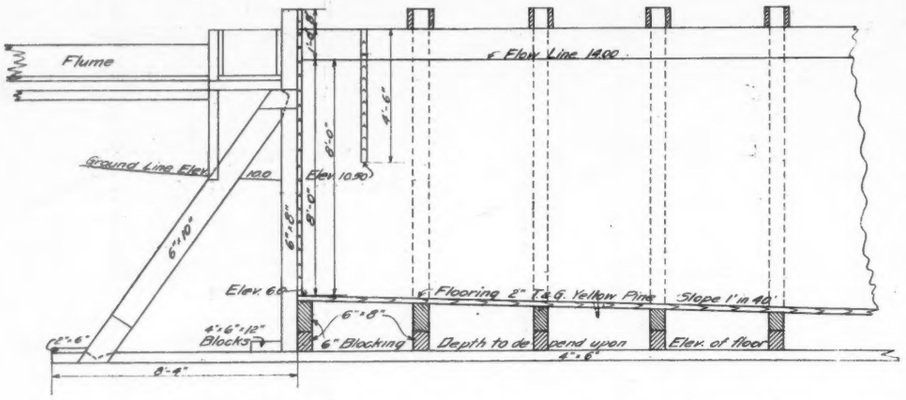
Tank No. 4 contained three baffles, all diverting the flow downward. There were five baffles in each flow chamber of tank No. 5, three diverting the flow downward and two upward.

Septic Tanks.—Tanks Nos. 6, 7 and 8 were operated as septic tanks; but No. 6 was completely remodeled during the tests and was therefore treated as two separate tanks. It was originally a duplicate of No. 5, but in May was remodeled into a 120-foot tank by means

CLEVELAND SEWAGE TESTING STATION.
For 2,000 feet toward the background, and is about to build a breakwater 700 feet off shore and fill behind it.

of two longitudinal partitions dividing the tank into three sections in such a way that the sewage passed back and forth through the tank three times.

Tank No. 7 was operated as a shallow septic tank for the first eight months of the tests, after which it was put out of commission. It was 8x40 feet in plan and 9 feet deep from the flow line to the bottom of the hoppers. There were three wooden hoppers each 8 feet by 13 feet 4 inches in plan and 4 feet 6 inches deep, each hopper equipped with a sludge drain similar to those in tanks 3 and 4.



LONGITUDINAL SECTION OF TANK NO. 5 OR NO. 6.

Tank No. 8 is of unusual design, being narrow and deep at the inlet end and shallow and wide at the outlet. The tank is 40 feet long, and the sides diverge from a width of 4 feet at the inlet to 8 feet at the outlet end. The bottom is formed into three concrete hoppers, which are respectively 10, 9 and 8 feet deep below the flow line. By this design it was intended to so regulate the velocity and sludge capacity at different sections of the tank that the sludge would be deposited in an even layer over the bottom of the tank.

After the tests were started, inlet and outlet baffles were placed in tanks 6, 7 and 8, and later a different set of baffles was placed to obtain better displacement and longer storage periods. As was the case with plain sedimentation tanks 3, 4 and 5, the actual detention periods fell short of those computed from the total displacement.

Imhoff Tanks.—Tanks Nos. 9 and 10 were designed as 2-story or Imhoff tanks, and as Nos. 4 and 5 were remodeled into this style of tank, four tanks of this type in all were operated in the tests.

Tank No. 9 was 10x20 feet in plan and 24 feet deep from flow line to the bottom of the concrete hoppers. There were two hoppers, each 9x9 feet in plan and 5 feet deep. As in No. 5 remodeled, there were two flow channels separated by a gas vent, each channel 4 feet 6 inches wide and 4 feet 7 inches deep at the center, sloping to 10 feet 1 inch deep at the sides, where it was trapped.

Tank No. 10 was 10x20 feet in plan and 19 feet deep, with concrete hoppers of the same dimensions as in No. 9. The flow chamber in this tank was not divided, but passed through the center of the tank with a gas vent on either side. It was 7x20 feet in plan and 11 feet deep at the trap at the center, sloping upward to 7 feet 6 inches deep at the sides. Each hopper in tanks 9 and 10 was equipped with a sludge drain similar to those previously described.

Each flow chamber of tank No. 9 had two baffles diverting the flow upward and one baffle diverting it downward. As was the case with all tanks operated from the beginning of the tests, tank No. 10 originally contained but one inlet and one outlet baffle, but later these were replaced with five baffles, three diverting the flow downward and two upward.

Other Tanks.—In addition to these tanks there were provided two dilution tanks, each 8x10 feet in plan and 6 feet deep, to study the question of diluting the sewage with lake water to make it inoffensive; two auxiliary settling tanks, each 7x10 feet in plan and 15 feet deep, for clarifying the wash water from the roughing filters or scrubbers; and two sludge digestion tanks, each 7x7 feet in plan and 16 feet deep. Because of damage by storms or for operating reasons, very little use was made of these tanks.

The tanks were constructed of 2-inch tongued and grooved Norway pine lumber fastened to yellow pine 6x6 and 8x8 framing. Wooden bottoms were placed in tanks Nos. 5, 6 and 7; Nos. 5 and 6 being flat and No. 7 containing three hoppers. The other tanks were built with concrete hopper bottoms. For the most part the tanks were water-tight, though some difficulty was found in making the wooden bottom tanks tight before sufficient sludge was deposited to fill the cracks. The deep tanks were mostly in clay soil, which helped to make them water-tight; but tanks Nos. 3, 4 and 9 were located near the banks of a creek and it was necessary to waterproof these tanks with 4 to 8-ply tar paper and pitch. All tanks were equipped with means to remove the sludge without interfering with the operation. The piping within the tanks, as well as other piping used in connection with the filters and disinfection, was cast iron soil pipe. The valves were all light weight gate valves made by Crane & Company.

Screens.—Within a frame building 20x30 feet were located four screen boxes, each 2½x5 feet in plan and 2 feet deep, for studying different types of screens. This building also contained an electric-driven centrifugal machine for drying the screenings, the heating plant for the laboratory, the general workshop and bins for the storage of partially dried sludge.

Filters.—Three rapid filters or scrubbers and one sprinkling filter were operated at the testing station. The rapid filters were each 10x6 feet in plan and provided with such piping and fittings as are necessary to operating mechanical water filters. Filtering material was contained in a water-tight wooden box with concrete bottom on which was laid a collecting system consisting of an 8-inch iron pipe, running the length of the filter, into which were tapped 2-inch perforated iron pipe at 6-inch centers. This collecting system was connected to the city main and used to introduce the wash water. The filtering material in filter No. 1 was three feet deep and consisted of limestone, ranging from ¾ inch to ½ inch. There were 3½ feet of limestone and gravel in filter No. 2, while filter No. 3 contained 2½ feet of limestone and gravel; the material in filter No. 3 being larger than that in No. 2. The influent to these filters was the effluent from three of the settling tanks and the volume of sewage, which was kept constant, was controlled by weirs.

The sprinkling filter was 12 feet square and consisted of a wooden water-tight box with a concrete bottom in which was placed 4 feet of ¾-inch slag. The sewage was fed onto this filter through one nozzle located in the center. To obtain the required head a hydraulic ram

was installed whereby sewage could be pumped from any of the three tanks used for the roughing filters to a siphon chamber in which was set a 3-inch Miller siphon. The filter was thus dosed intermittently and there were no other rest periods.

To house the hydraulic ram for the sprinkling filter and the valves and piping for the roughing filters, a filter gallery was built extending across one side of the four filters.

Disinfection.—For the study of disinfection a two-story wooden structure 16 by 32 feet in plan was erected on the shore of the lake. On the lower floor were located the three chemical storage tanks. Two of these were used for the storage of calcium hypochlorite solution and were each 8 feet in diameter and 11½ feet deep; one constructed of galvanized iron, painted with enamel paint, and the other of wood, also painted. For the storage of the sodium hypochlorite solution there was provided a concrete tank 4 feet square and 5½ feet deep. These materials were purposely chosen in order to study the effect of hypochlorite solutions upon them. On the lower floor also was located the feed box which could receive the solution from any of the three tanks. This box had six adjustable orifices through which the disinfecting solution was fed directly into 6-inch iron pipes, through which the sewage to be treated was passing and which emptied into separate reaction tanks located directly behind the disinfection house.

On the upper floor were stored the calcium hypochlorite and the mixing box for it. The salt, brine tank, electrical apparatus and the electrolytic cell for the production of sodium hypochlorite were also located on this floor. The cell is known as the Dayton cell and was so placed that the effluent from it fell directly into the concrete tank.

A one-story frame structure 30x40 feet was built for the laboratories and administration building. It was divided into an engineer's office, preparation room, chemical laboratory and bacteriological laboratory. The laboratories were fully equipped with all apparatus necessary for analytical work, both chemical and bacteriological. There was a shower bath and water closet, and all rooms were equipped with necessary sinks, drains, water taps, gas cocks and electric lights. The building was heated by a steam furnace located in the screen house.

Sludge Beds.—On the shore of the lake four open sludge beds were located; these beds had an average area of 95 square feet and were filled with lake sand to a depth of about 18 inches.

Adjacent to these open sludge beds there was a covered sludge bed 10x20 feet in plan and containing 13 inches of material graded from 2-inch limestone to lake sand. This bed was contained in a tight wooden box, the bottom of which was sloped toward a central drain. A glass cover supported by a triangular roof truss, constructed of 2x4's, was built over the bed. At one end of the building was located the door and at the other end a stove. Directly beside the door there was installed an exhaust fan to remove the moisture saturated air and keep a layer of dry air in contact with the sludge.

Sludge Pressing.—For studies in sludge pressing two filter presses were used, one known as the Sweetland press, built by the Sweetland Filter Press Company of New York City, and the other the Moore filter press, built by the Moore Filter Press Company of New York City. Neither of these presses is of the type previously used for sludge drying but were adaptations to the problem of sludge disposal of presses used for other purposes. The Sweetland press is most commonly used in connection with the beet sugar industry and operates under air pressure, which is applied to the sludge on the outside of the filter leaves. The field of the Moore press has been principally in connection with the cyanide process of gold recovery. It operates by suction from within the leaves. Only a small unit of the latter press was used at the station and experiments with it were conducted within the laboratory. A working unit of the Sweetland press, however, was obtainable and it was housed within a frame building constructed over the two sludge digestion tanks. This building also contained a steel sludge storage tank, air compressor and motor.

NATURE AND SCOPE OF INVESTIGATION.

The nature and scope of the work done at the testing station may be summarized as follows:

1. A thorough study of the character and volume of the sewage of the city. While the studies made were principally in connection with the sewage as received at the outfall sewer where the testing station was located, studies were also made upon samples collected at the outlets of other sewers. At some of these measurements of the flow were taken and experiments made with different treatments with small plants located at their outlets. These investigations comprised routine chemical analyses and special studies in dissolved oxygen, bacterial content, and suspended matter upon samples taken by various methods.

2. Comprehensive investigation was made of the manufactural and trade wastes of the city's industries. This included not only those which at the present time are discharged into the interceptor, but also those which will have to be cared for at plants located on the south and west sides. In this connection there should be included also the studies made upon wastes from the municipal garbage plant.

3. The question of grit and grit chambers received an unusually large amount of attention. Studies were made of the volume and character of the grit deposited under different velocities, detention periods, and types of sewage, such as storm and dry weather sewage. A large number of analyses were made and the question of the disposal and utilization of the grit was thoroughly studied.

4. At the present time chemical precipitation with lime or iron or lime and iron is being studied.

5. All told 12 settling tanks were operated. These included all the standard types of tanks, there being three horizontal flow settling tanks, four septic tanks, one vertical flow settling or Dortmund tank and four Imhoff tanks. Complete analytical analyses were made of the effluents from these tanks.

6. Screening experiments were made upon the sewage as received at the testing station and also at the outlet of the West 58th street sewer. Analyses were made of the influent and effluent to the screens and of the screenings retained.

7. Three roughing filters and one sprinkling filter were operated as secondary or final treatment devices. Records were kept of the efficiencies of all these devices, the rates of treatment and, in connection with the roughing filters, the volume of wash water required and the character of the material deposited upon the surfaces.

8. In connection with the disinfection, studies were made, not only upon the removal of bacteria by both calcium and sodium hypochlorite solutions, but also upon the cost of production, in Cleveland, of sodium hypochlorite, and the effect of partial sterilization upon the stability of the sewage.

9. Studies in connection with sludge were made from many different angles and included records of the amount of sludge deposited by various types of tanks; the character of these sludges, as determined by a large

number of analytical analyses and observations; the disposal of sludge by uncovered and glass covered sludge beds, by sludge pressing with two different types of presses; the effect of storage of partially dried sludge in covered bins during the winter months; the utilization of sludge as a base or filler for fertilizers with special reference to its final treatment at the municipal garbage plant in connection with the tankage obtained there.

10. The effect of the sewage discharged at the outfall sewer upon the lake and bathing beaches in that vicinity was studied by analyses and observations made during trips on the lake covering the area affected by the sewage, and by observations made along the shore to determine the amount and character of sewage-borne material washed upon the beach.

11. Analyses were made of the gases generated by various tanks and also of the sewer air as found in the interceptor for about 2,000 feet back of the outlet.

12. Mention should also be made of the fact that the laboratory and analytical work in connection with the experimental water filtration plant was done at the laboratory of this station.

The testing station has been under the general direction of the Department of Public Utilities, of which Charles W. Stage is now director. During the construction and early operation W. J. Springborn was director. R. W. Pratt was engineer in charge and is now consulting engineer to the Bureau of Filtration. Up to a few months ago H. B. Hommon was chief chemist and bacteriologist, but (on entering the U. S. Marine Hospital Service) was succeeded by H. H. Wagenhals.

OPERATION OF SEWAGE DISPOSAL PLANTS

Treatment of Trade Wastes Before Discharging Into Sewers—Chemical Precipitation—Grease Recovery —Testing or Experimental Stations.

By FRANCIS E. DANIELS, A. M.*

This is the tenth installment of a series of articles by Mr. Daniels. The others were as follows: January 15—Grit chambers and screens; regular frequent cleaning most important. February 19—Skimming, sedimentation and septic tanks; keeping daily records of operation; duplicate units; treatment of sludge and scum. March 10—Emscher tanks, principles of operation and design; baffles and scum boards; gas vents and scum; cleaning slopes and slots; drawing off sludge; sloudge beds and sludge disposal. April 16—Contact and sprinkling filters—periods for each of the four phases; filtering medium and drainage; keeping surface open; automatic control apparatus; how to make nutrescibility tests. May 21—Sprinkling filters, care of nozzles, settling basins; natural and artificial sand filters. June 18—Operation of sand filters; land treatment; sub-surface irrigation. July 16—Disinfection; purpose, principle, history. Condition of sewage necessary. Application of hypochlorite. August 20—Purchasing hypochlorite; apparatus for applying it. Liquid chloride. September 17—Chemical precipitation. Electrolytic treatment.

TRADE WASTES.

The waste waters from the various trades and manufacturing processes are so complex and diversified in character that in order to secure the best results in the purification treatment, each waste is often made the subject of experiment.

When the waste is of a relatively small amount and of a character which will permit of its being discharged into the sanitary sewerage system, it usually has little appreciable effect upon the regular treatment at the disposal works. At one of our factories in which pipe fittings are made, all the iron pickling liquors, oils and soap waters from the tapping machines are discharged into the sewer along with the toilet wastes from the employees. The resulting sewage is very satisfactorily taken care of in a disposal plant of the ordinary style, consisting of pumps, sedimentation tank, dosing tank, sprinkling filters, secondary settling tank and sand beds. In fact, almost every city sewerage system carries unobjectionable trade wastes from manufacturing establishments. These wastes when in large quantities often have to be considered in the choice of the type of disposal works, and they often modify the operation, but usually little difficulty is experienced.

On the other hand, when the wastes are of such a character as to exclude them from the sanitary sewer or when the factory is in an isolated location, special works for their treatment must be established. These works must of necessity be designed and modified to meet the needs of each particular case, and it will be impossible at this time to lay down definite rules or instructions to be followed, because, as intimated above, each installation must be the result of special consideration, study and perhaps experimentation.

When the ordinary biological processes are not sufficient, applications of chemicals or electricity are often resorted to as an aid in the preliminary treatment. In order that such treatment may be effective with the least possible expense, each case must be considered, both as to the character of the wastes and to the quality of effluent required. Care must be exercised in the selection of the proper chemicals and also in the intelligent and scientific application of them to the solutions to be treated.

At some plants which take care of wastes from milk bottling establishments, chemical precipitation with water-slaked lime works fairly satisfactorily if the attendant carries out the instructions faithfully. In these cases the waste waters are heavily charged with some of the common washing compounds, consisting for the most part of alkaline carbonates. The carbonates unite with the lime, forming a precipitate of calcium carbonate, which in settling clarifies the solution. The resulting liquid is then treated on a filter or run directly into some body of water. If, however, insufficient soda or washing powder has been used or if the lime has become air-slaked or if the lime is just thrown in without slaking it properly in water, little if any good is accomplished. The writer has met with all these faults because the attendant did not realize the importance of carrying out his instructions to the letter.

For the treatment of milk wastes, a combination of alum and lime works better than lime alone, but additional precautions in the operation are necessary. The alkalies should be added and well mixed with the wastes, before the addition of the alum, in order to secure the best effect of the reaction.

For milk wastes in moderately small quantities, the writer prefers as a preliminary process a long septic tank treatment of a week or more in duration. By this means the organic matters are given an opportunity to be broken down and the objectionable intermediate products of decomposition are allowed to go over into more stable and less offensive compounds.

This is in accordance with the manner in which the decomposition of many organic substances takes place. In order to prevent nuisances, either the intermediate decomposition products must not be allowed to form or they must be undisturbed until they have been broken down into their final compounds.

The effluents from such a process may be treated on land or on filters, or under some circumstances may be discharged into bodies of water.

The wastes from dye works, paper mills, tanneries and such establishments are often precipitated with chemicals as a preliminary treatment, while the grease from wool scouring processes is recovered by the application of sulphuric acid.

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As it will be impossible to go into details as to the management of trade waste plants, on account of their diversity in character, it will be sufficient to urge that the man in charge thoroughly acquaint himself with his plant and with the principles underlying all the processes involved, and that he carry out the operation strictly in accord with the principles in every detail.

TESTING STATIONS.

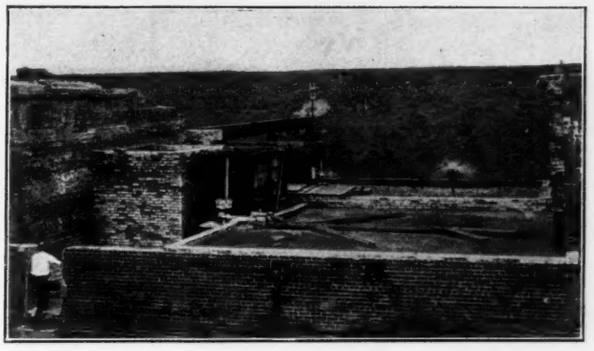
Sewage testing stations are often called experiment stations. In fact, they are both. Reference has already been made to these works in regard to having them operate under precisely the same conditions under which the final plant will have to work and also it was pointed out that data and results obtained at such stations must always be considered in conjunction with the conditions under which such results were derived. There are still other important features connected with testing stations.

It would seem that the mere establishment of a sewage testing station presupposed maintenance funds; but the writer has seen much valuable time and many important data lost on account of the lack of some simple and comparatively inexpensive facilities for grasping the opportunities. The writer knows of a testing station with almost unlimited funds back of it, but the manager is so handicapped with red tape that should something happen to a pipe and his one wrench, it would take about six months to get through a requisition for the purchase of a new wrench to fix the pipe, so that the station could continue to operate. At this plant experiments are often delayed for weeks because some little carpenter work is needed and the only available man, although quite capable of doing the work well, is prevented from doing it because he is rated on the Civil Service list as a painter, or some other knight of the trade. In experimental work emergencies cannot be foreseen, therefore supplies and facilities should be provided to take care of break-downs and things likely to happen, while a sufficiently large petty cash fund should always be set aside and the manager given full power to expend as much of the funds as may be necessary in emergencies. If the manager cannot be trusted to do this, then get another manager; for if he does not have sufficient leeway, his data and results are likely to be very incomplete and oftentimes worthless. The purpose of a testing station is to find out data bearing on the subject in hand. If this is not done fully and properly, time and money will surely be wasted.

The man in charge of a sewage testing station should be a good all-round man in his line. He should have had training along all the lines of sewage disposal and should have a fair knowledge of chemistry, bacteriology, biology, microscopy and allied sciences, not to mention the different branches of sanitary engineering. He should be wide-awake, resourceful and always ready to grasp the opportunities and meet the emergencies as they come along. Some good managers can hardly drive a nail, and when this is the case a good "handy man" should always be around. Things need fixing at experiment stations mighty often and many times work must be done quickly and at the same time well. Structures, although temporary, must be made so as to be safe and not endanger life or limb.

Good and reliable chemical, bacteriological and engineering work must be done and likewise the work of taking samples must be faithfully and conscientiously performed. Inclement weather often seriously interferes with experiment station work, and it is usually at such times that results are most needed. Every effort should be made to have the station run properly under those conditions.

At isolated experiment stations it is often difficult to obtain supplies or have made up special pieces of apparatus. It is upon these occasions that the resourcefulness of the laboratory man is called upon. While of course every laboratory should possess a blast lamp, such is not always the case. At one time the writer was called upon to construct a complicated piece of glass apparatus involving the sealing and bending of large tubes, capillary tubes and stop-cocks. He constructed a blast lamp out of an ordinary glass test tube and a small piece of glass tubing, and furnished the blast by pumping the air and water from a small faucet suction pump into a bottle, using the air for the blast and allowing the water to flow off into the sink. With this apparatus quite considerable glass blowing was successfully done. This is mentioned to show how things at hand may be utilized, when necessary, in place of more elaborate and costly apparatus.



EXPERIMENTAL FILTERS AT THE M. I. T. EXPERIMENTAL STATION.

SEWAGE TREATMENT AT MT. KISCO.

Septic Tanks, Primary and Secondary Contact Beds and Sand Filters, with Hypochlorite Treatment—Maintained by New York City.

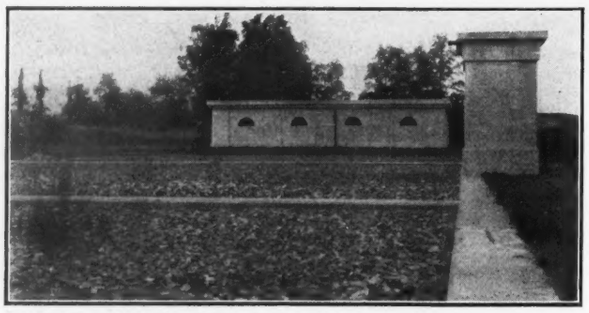
Situated within a water shed controlled by the city of New York, the complete sewage disposal system of the village of Mt. Kisco is operated and controlled by the city. The system consists of septic tanks, contact beds, a settling tank, sand filter beds and a chloride of lime treating tank. It was put in operation in 1910. Great care is taken in its operation and maintenance and daily tests are made of samples taken from the effluent, both before and after the lime treatment.

The sewage from the village is carried to a pumping station through three mains, one 18 inches in diameter and the other two 10 inches. Here it is screened and forced by centrifugal pumps through a 10-inch pipe to the filtration plant 2,800 feet away and 50 feet higher. The daily flow averages about 200,000 gallons.

The pumping plant is located about one-half mile southwest of the village. Here the sewage is screened by means of two removable screens. The solid matter collected is carted to a gravel bank near the filter beds and buried.

The pump equipment comprises two centrifugal pumps, each driven by a 10 h. p. motor and having a combined capacity of 700 gallons per minute. There is also an auxiliary pump driven by a 20 h. p. gasoline engine and having a capacity about equal to the combined capacity of the other two. This pump is used only in case of accident to or failure of the electrical equipment.

The sewage, coming from the pumping station through the 10-inch pipe, goes directly into the septic tanks, which are enclosed in a reinforced concrete building 53 x 54 feet. There are six tanks in all, each 53 x 8 feet and 10½ feet deep, and these are connected into series of three each, giving two complete tanks, each 159 feet long, 8 feet



PRIMARY CONTACT BEDS.
Septic Tank in Rear.

wide and 10 feet 6 inches deep. These two units are used alternately.

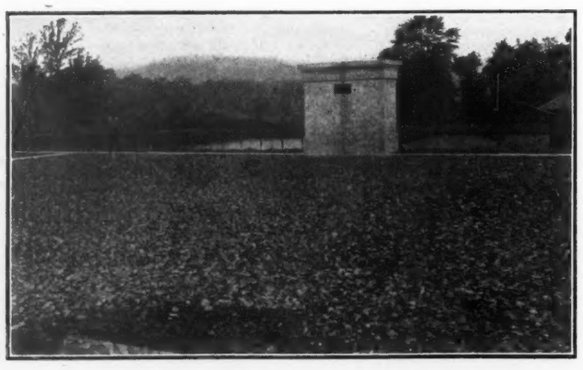
The size of the tanks is such that the sewage passes through in about 12 hours, giving a velocity of about .0036+ feet per second. A scum board, placed between the second and third tanks, about 36 inches high, extends down into the sewage 32 inches.

At the end of the third tank the effluent passes over a weir 8 feet long. From here it goes through an underground pipe to the control house for the primary contact beds. These beds, three in number, are each 64 x 76 feet and are filled with 1½-inch broken stone to the depth of 4½ feet. The flow into these beds is regulated by an Ansonia automatic control. Eight hours is required for filling and the tank is allowed to stand full for the same length of time. Draining is accomplished in about one hour and the bed is then allowed to stand for the remainder of the 24 hours. The same program is followed with the secondary beds, which are located just below the primary ones. The secondary beds are of the same size as the primary.

From the secondary beds the effluent goes to the settling tank and thence, falling over a weir, passes into the sand filter beds. There are two of these beds, each 66 x 117 feet, and filled with sand to a depth of 30 inches. About 18 inches of effluent are allowed to flow on at once. This will drain through the sand in from two to ten hours, depending on the previous condition of the sand bed. These sand beds are cleaned about once a month, all the deposits and a very thin layer of the sand being scraped off with a snow shovel.

Just below the sand filter beds is the treating station. Here is added the chloride of lime. Ordinarily about 80 pounds per day is used, or at the rate of one pound per 2,500 gallons. A small dam has been built just below the station and the effluent is held here until the chemical has had time to take effect.

Samples of both treated and untreated sewage are taken daily and carried to the laboratory for tests. By this means the work of the plant can be watched closely from day to day.



SECONDARY CONTACT BEDS.
Sand Filters in Rear.

TESTING SEWER AND DRAIN PIPE.

Methods Employed by Committee of American Society for Testing Materials—Formulas for Modulus of Rupture—Standard Specifications Recommended.

By action of the Executive Committee of the American Society for Testing Materials, a committee was created in March, 1911, to prepare "Standard Tests and Specifications for Drain Tile." This committee was divided into five sub-committees on Strength Tests, Durability, Constructions and Field Specifications, Data of Manufacture of Concrete Tile and Data of Manufacture of Clay Tile.

The International Clay Products Bureau of Kansas City, Missouri, agreed to furnish the clay tile. The Engineering Experiment Station of the Iowa State College supplied the funds for the manufacture of the concrete tile, which were made at the factory of A. S. Tanner, Jefferson, Iowa.

The final program included 600 tests, evenly divided between sizes of 8 inches, 16 inches and 24 inches respectively and between concrete and clay tile. Forty tests of each size and each material were made with sand bearings, twenty with hydraulic and forty—with two machines—by three-point bearings.

The purpose in mind when the tests were planned, executed and reported was to determine the comparative value of results secured by using different types of bearings. It was desired, also, to determine if possible reliable ratios between average breaking loads on similar tile obtained by the use of different bearings.

Three types of bearings and two machines were used —sand bearings with an Iowa machine, hydraulic bearings with a Universal machine and three-point bearings with both machines.

The following is a description of sand bearings and the Iowa machine in which they were used: The lower bearing consisted of a wooden box open at the top and partially filled with clean, graded sand. The box rested on a scale platform or on a system of levers which transmitted a certain fraction of the downward pressure to a scale platform. The upper bearing was of a wood box open at the top and bottom and partially filled with sand. A bearing plate made of a wood plank rested on top of the sand and fitted inside the box. The breaking load was applied by means of a jack, operated by a hand lever. The sand boxes were so constructed that the tile was embedded in the sand for 90° of the circumference at the top and the same at the bottom.

The hydraulic bearings consisted of two timbers, each

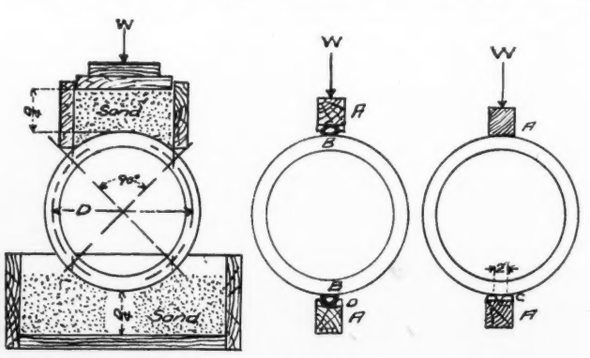


FIGURE 1 FIGURE 2 FIGURE 3

SKETCH SHOWING BEARINGS FOR TESTS.

1. Sand Bearings. 2. Hydraulic bearings. 3. Three-point bearings. A, yellow pine stick, at least 4x4. B, 2½-inch hose filled to ½ to ⅝ its capacity. C, half-round strips. D, quarter-round strips.

having one concave side, with a section of 2½-inch fire hose, one-half to two-thirds full of water, held against the concave side of the timber.

The three-point bearings consisted of two 4 inch by 4 inch timbers, with half round strips nailed on. The lower timber had nailed to its top two half round strips, 2 inches apart, center to center. But one strip was used on the under side of the top timber and the committee finally decided to omit this in future tests. A strip of rubber belting was inserted between the strips and the tile, but the committee decided to discontinue the use of this also on future tests.

The clay tile were roughly graded and marked as to whether they were hard, soft, oblong or elliptical, blistered or cracked. They were then separated into groups for the different methods of testing. As nearly as possible the same proportions of each grade were tested by each method.

All the clay tile were dry when tested. Many of the 24-inch and 16-inch concrete tile were tested directly after being in contact with the earth and 3 or 4 inches of their perimeter appeared quite damp.

From all results of the test it was found that sand bearings require from one to seven minutes more per test than the other bearings, but come much nearer giving the real supporting strength of the tile in the ditch. Hydraulic bearings distribute the load very evenly and permit rapid testing, while the three-point bearings are the simplest and most convenient to use.

The results of strength tests for three such widely different bearings, together with other former tests, make it possible to develop reliable formulas for calculating the moduli of rupture of the shells of test tile, directly from the breaking loads in strength tests.

The resulting formulas are:

$$M = 0.20^{*}\ R\frac{W}{12} \quad (1) \qquad \text{and} \qquad P = \frac{6M}{t^2} \quad (2)$$

where

M=the maximum bending moment in the tile shell in inch pounds per lineal inch.

R=the radius of the center line of the tile shell in inches.

W=the "Ordinary Supporting Strength" of the tile in pounds per lineal foot.

P=the modulus of rupture of the material of the tile shell, in pounds per square inch.

t=average thickness of the tile shell in inches at the top or bottom, whichever averages thinner.

Formula (2) is well known and requires no explanation, since it is the formula for calculation of outer fiber stress in beams of rectangular cross-section, when the bending moment per unit of width is known. The general form for formula (1) has been established for a large number of theoretical conditions of distribution of the loads W. For example, the coefficients of $R\frac{W}{12}$ will be:

0.318 for concentration of W along mathematical lines above and below;

0.169 for uniform horizontal distribution of W over 90° of the circumference above and the same below;

0.125 for uniform horizontal distribution of W over 180° of the circumference above and the same below.

Heretofore, the difficulty in calculating the modulus of rupture in drain tile has been the uncertainty as to the real distribution of the load and the actual effect of the variations of the tile shells from point to point in them.

With sand bearings it would seem that the load would be heavier toward the center of the bearing than at the sides. This, then, would call for a higher coefficient than 0.169. Again, with sand bearings, the bending moment is distributed around the circumference in a different way than in a concentrated load. This would call for a higher coefficient in figuring the bending moment for the breaking load.

At the Iowa College Experiment Station tests made of transverse beams cut from 28 concrete tile gave an average modulus of rupture of 730 pounds, as compared with 610 pounds calculated using coefficient 0.167. Similarly 29 clay tile gave comparative values of 1580 and 1310. Hence the true coefficient for said bearings should be:

$\frac{730}{610} \times 0.167 = 0.200$ as indicated by concrete tile.

$\frac{1580}{1310} \times 0.167 = 0.201$ as indicated by clay tile.

Further, the experiments indicate that for hydraulic bearings this coefficient should be multiplied by 1.25, and for three-point bearings by 1.50; or

$M = 0.20\ R\frac{W}{12}$ for sand bearings.

$M = 0.25\ R\frac{W}{12}$ for hydraulic bearings.

$M = 0.30\ R\frac{W}{12}$ for three-point bearings.

Hence the formula will be:

$$M = 0.20\ R\frac{W}{12}$$

It is important that the drainage engineers shall be able to calculate in advance the probable maximum loads that are liable to rest on the tile from the weight of ditch filling. The mathematical theory of loads on pipes in ditches, when developed, leads to the simple formula:

$$W_f = C\,w\,B^2$$

W_f = the load on a pipe in a ditch in pounds per lineal foot from the weight of the ditch filling.

C = coefficient of loads on pipes in ditches for ditch filling.

w = weight of ditch filling material in pounds per cubic foot.

B = the breadth of the ditch a little below the top of the pipe, in feet.

The results obtained by the formula show a surprising correspondence with the results obtained by direct weighings of loads on pipes in ditches.

SUMMARY OF GENERAL CONCLUSIONS.

The conclusions from the investigations which were made the basis of definite action by the committee may be summarized as follows:

1. The committee is justified in recommending at this

*This coefficient for sand bearings only.

time to the American Society for Testing Materials, for adoption, three sets of standard specifications, as follows:

A. Standard Specifications for Strength Tests of Drain Tile.

B. Standard Specifications for Quality of Drain Tile.

C. Standard Specifications for "Recommended Practice" in tile drain design and construction.

2. The committee is not justified in recommending at this time any specifications for absorption or other durability tests, nor for any corresponding requirements for drain tile.

The special investigations of absorption and durability tests and requirements, under way for the committee at the University of Wisconsin, are to be continued and their results reported during the year 1914-1915.

A. STANDARD SPECIFICATIONS FOR STRENGTH TESTS OF DRAIN TILE.

3. The committee is justified in recommending in its standard specifications permission for the use of all three of the bearings investigated, viz.: Sand Bearings, Hydraulic Bearings, and Three-Point Bearings.

4. The results of all strength tests of drain tile shall be reported in terms of the same unit, which shall be the "Ordinary Supporting Strength," obtained by multiplying the breaking loads in strength tests by the following factors: Sand Bearings, 1.00; Hydraulic Bearings, 1.25; Three-Point Bearings, 1.50.

B. STANDARD SPECIFICATIONS FOR QUALITY OF DRAIN TILE.

5. It is advisable to divide drain tile into three general classes, as follows:

No. 1 Extra A. The best and strongest drain tile often made.

No. 1 A. Good drain tile, representing the No. 1 tile from reputable and well-established factories.

No. 1 B. Fair drain tile, suitable for farm drainage systems.

6. The quality of drain tile cannot be determined reliably without the aid of strength tests, and definite specifications of the "Ordinary Supporting Strength" required shall be made for each diameter for each general class of tile.

C. STANDARD SPECIFICATIONS FOR "RECOMMENDED PRACTICE" IN TILE DRAIN DESIGN AND CONSTRUCTION.

7. The strength of drain tile in ditches is so connected with pipe laying practice, and the loads on such drain tile are so dependent on the dimensions of the ditch and the character of the ditch filling material, that it is essential to drainage engineers to have authoritative specifications for "Recommended Practice" to govern the most essential features of tile drain design and construction (as related to stability).

8. It is advisable to divide pipe laying practice into three classes, as follows:

"Ordinary" pipe laying, representing the most common practice in tile drain construction under a drainage engineer.

"First-Class" pipe laying, watched constantly by an inspector, and representing the best pipe sewer practice.

"Concrete-Cradle" pipe laying, used to furnish extra strength when, in very deep and wide ditches, or under other unfavorable conditions, the loads on the drain tile are too great for safety with the best drain tile economically obtainable.

9. The committee is justified in specifying tables of standard maximum loads on drain tiles in ditches of different depths and widths, and for different ditch filling materials.

10. A safety factor of 1.5 for "Ordinary" pipe laying should be specified to insure sound drain tile, when applied to the "Ordinary Supporting Strength" of the tile determined by strength tests, and to the standard tables of loads for different ditches and filling materials.

For "First-Class" pipe laying a "nominal factor of safety" of 1.25 will be sufficient.

For "Concrete-Cradle" pipe laying the concrete cradles will afford all the strength needed to carry the loads, independent of the strength of the tile, but only No. 1 A or No. 1 Extra A pipe should be used with concrete cradles.

At its meeting on April 20, 1914, the committee adopted three sets of standard specifications in accordance with the above principles, and recommends their adoption by the American Society for Testing Materials.

NEW ELECTROLYTIC SEWAGE TREATMENT.

Description of Plant Being Tested by Queens Borough, New York—Results as Determined by Municipal Chemist and Engineer.

Last March there was installed in one of the sewage purification plants of Greater New York, that known as the Elmhurst disposal plant, in the borough of Queens, a small plant using electricity as one of its principal features, the object being to permit the city officials to study the operation of this process. The plant was furnished by the Electro-Chemical Corporation, being the invention of C. P. Landreth of Philadelphia. The plant itself was originally constructed for the electrical purification of water and not of sewage, and therefore certain features of it, referred to later, were not best adapted to sewage purification. The nominal capacity of the plant was stated to be 25,000 gallons per day. On August 31, Elmer W. Firth, engineer of maintenance of the Bureau of Sewers, borough of Queens, and P. M. Travis, chemist of that borough, submitted reports setting forth the result of their experiences with and conclusions concerning this plant.

In studying any plant for this purpose, the matter of cost is, of course, an important one, and is referred to in these reports, but the company claims that conclusions as to cost based on this plant would not be fair to the plant, since its form was not that best adapted to sewage purification; the plant itself is small and gives a higher cost per unit than would a large plant, and finally no effort was made to keep expenses down to the minimum, the effort of the company being rather to demonstrate the effectiveness of the plant in securing purification without special consideration to saving in operating costs.

The plant is located in the building of the Elmhurst sewage disposal plant, where approximately one million gallons of sewage a day are being treated by passing it through four sedimentation tanks, the effluent from which flows onto one acre of sand filters; the sludge from the tanks being dried upon beds of pea coal in which steam pipes are embedded, coal and sludge being finally burned under the boilers which furnish the power for pumping the sewage into the settling tanks.

The electro-chemical apparatus was placed on a platform over one of these tanks. It consists of a box of cypress 4 feet 10 inches high and 18 x 24 inches in horizontal cross-section. In the bottom of this is a bank of ten carbon plates or electrodes, and above this are four other banks, each consisting of twelve iron electrodes. All of these electrodes are placed horizontal, and the several banks are separated from each other by a space of about 3 inches, while the iron electrodes are spaced 3/8 of an inch apart. These electrodes are made of low carbon steel and are 10 inches by 16 inches by 3-16 of an inch thick. Sewage is admitted in the bottom under

the carbon electrodes and passes between the several electrodes, thence between the several iron electrodes in the first bank, across the intervening space and between those in the second bank and so on; the construction being such that the sewage is required to follow this route. Thus every particle of sewage must pass four times between two electrodes which are ⅜ of an inch apart. After passing through these, the sewage leaves at the top of the tank, is discharged into a flume containing a weir, and from this into a sedimentation tank. The effluent from the sedimentation tank falls into one of the four large sedimentation tanks of the Elmhurst disposal plant, the capacity of which is about 68,000 gallons.

Between each two iron electrodes are two paddles which are revolved in opposite directions, one slightly in advance of the other, and thus aid rather than retard the revolution of each other. These paddles are 9 inches long, ¼ inch thick and 2½ inches wide at the center, tapering to 1⅛ inches at each end. These are revolved by two vertical shafts of ¾-inch steel which are operated by a motor in the base of the apparatus.

Above the carbon electrodes and immediately below the first bank of iron electrodes is a pipe through which a lime solution is injected.

An inessential feature of the plant is a 2-inch centrifugal pump, which lifts the sewage from the channel which feeds the large settling tanks and forces it through the electro-chemical apparatus.

The carbon electrodes are connected in series. In each bank of iron electrodes, alternate electrodes are connected in groups of threes and these groups are connected in series. The carbon plates, on the other hand, are in parallel with the whole set of iron electrodes, so that nine-tenths of the current is taken by the carbon and one-tenth by the iron electrodes. The iron plates are connected so as to be automatically short-circuited to a zinc plate in the top when the operating current is shut off. A volt meter and ammeter at the front of the machine indicate the current being used thereby. When inspected by a representative of this paper, these meters indicated 20 amperes and 7½ volts, and we are informed that this has been the rate and intensity of current used throughout most of the test.

A small tank is provided for making milk of lime, and a small plunger pump discharges this into the apparatus just below the iron electrodes, as previously stated.

The devices which are claimed to differentiate this process from any other electrolytic or electro-chemical method of treating sewage, are the paddles and this introduction of lime. The former are claimed to prevent polarization, breaks up solids in suspension and agitate the sewage so as to bring every particle thereof under the influence of the electrodes, keep the electrodes clean from any deposit and mix the re-agents produced electrolytically. It is explained that polarization is due to the tendency of ions to part with their electric charges more or less reluctantly, the positive ions attracted to the negative pole, for example, tending in some degree to remain positive and thus repel the following positive ions which would otherwise be attracted. The effect of the lime will be referred to later. Another feature is that the iron plates are not diminished any in volume by the operation, since they are short-circuited with a zinc plate, thus preventing decomposition and the increased resistance in starting the current experienced in using the older devices.

The reports of Messrs. Firth & Travis are abstracted below:

The carbon electrodes, being electro-chemically passive, produce hypochlorite, with its sterilizing effect, from the common salt or other electrolytes present. The lime solution is introduced above the carbon plates because if introduced below, the calcium base being more easily ionized than the sosdium base, calcium hydroxide rather than sodium hypochlorite would be liberated.

In other processes using iron electrodes, the electrodes have been consumed by the action of acid ions liberated from the electrolytes and producing ferric hydrate by dissolving the iron electrodes, this hydrate serving as a coagulant. In the Elmhurst plant, sufficient lime is added to neutralize the acid ions and prevent any eating of the iron electrodes. The calcium hydroxide, being readily ionized, liberates nascent oxygen from the hydroxyl, while the positive calcium at the cathode reunites with water to form calcium hydroxide again. In addition to this, a bulky hydrated calcium carbonate is produced which, with any ferric hydrate formed, furnishes a coagulant which settles out in a few minutes, carrying with it most of the suspended matter.

The amount of lime used at Elmhurst averaged about 1,200 pounds per million gallons. Analysis shows the hardness of the Elmhurst water supply to be 102 parts per million, and the lime necessary to overcome this 496 pounds per million gallons. This leaves about 700 pounds per million gallons of lime available after reducing the hardness. It appears that with perfectly soft water the amount of lime might therefore be decreased by about 500 pounds.

The electric power supply is alternating current, 2-phase, 220 volts, 60-cycle. The amount used for a rate of 25,000 gallons a day was 18 to 20 amperes at 7½ volts, or about one-fifth of a horse-power. As stated above, 2 amperes of the total amount go to the iron electrodes and are seriesed eight times, giving an efficiency of 16 amperes on the iron electrodes. It is considered that with an increase of plate area in larger machines, the voltage could be proportionately reduced, and that about 6 k.w. should be sufficient to effect as high a degree of purification as attained in these tests.

That the iron electrodes are not decomposed would appear from the fact that after running for two and a half months the sharp edges of the electrodes did not show any signs of wearing away, nor were there any indications of this a month later when inspected by a representative of Municipal Journal. Apparently the only reduction in thickness of the plates was that due to fine sand which was deposited on them from the sewage and moved over their top surfaces by the revolving paddles. It is proposed in the regular sewage purification machines to place the electrodes vertical, allowing sand and other heavy matters to settle in the bottom, where they can be drawn off.

A casual inspection shows that a remarkable result of some kind is produced by the process, the effluent from a small sedimentation tank coming out very clear, and that caught immediately as it leaves the electro-chemical machine showing the almost instant formation of flocs of material which settle to the bottom and leave a clear liquid in a very few minutes. Applying lime only in any amount would not, we believe, produce as rapid sedimentation. The effluent in the large tank, which represented the accumulation of four or five days or more, was very clear, although with a slight yellow tint, and had a very slightly perceptible odor, and that not unpleasant. The same can be said as to the odor from the sludge which was drawn off from the settling tank.

The chemist, Mr. Travis, gives several pages of data containing the results of his analyses, both chemical and bacterial. About six weeks after the plant was started in operation, sewage which originally had a bacterial content of from 1 million to 3½ million, showed 260 directly after electrolytic treatment and 106 after passing through the sedimentation tank; these results being obtained on agar plates, 48 hours incubation. Gelatine plates after

RESULTS OF TESTS OF ELECTROLYTIC TREATMENT AT ELMHURST, AS REPORTED BY P. M. TRAVIS.

Date.	Dissolved oxygen, parts per million. Raw sewage.	Dissolved oxygen, parts per million. After electric treatment.	Dissolved oxygen, parts per million. After sedimentation.	Oxygen consumed, parts per million. Raw sewage.	Oxygen consumed, parts per million. After sedimentation.	Temperature, C. Raw sewage.	Temperature, C. After electric treatment.	Temperature, C. After sedimentation.	Saturation, per cent. Raw sewage.	Saturation, per cent. After electric treatment.	Saturation, per cent. After sedimentation.	Free carbonic acid in raw sewage, as carbon dioxide.	Free caustic lime as calcium oxide, after sedimentation.	Calcium carbonate. Raw sewage.	Calcium carbonate. After sedimentation.
May 19	3.04	2.80	4.19	.....	....	14.5	16.5	16.3	29.6	28.4	42.4	19.8	72.93	230.0	126.00
May 20	4.03	3.86	4.27	.....	....	13.0	15.5	15.0	38.0	30.4	42.0	21.1	42.56	231.0	180.67
May 21	3.20	4.96	4.32	10.51	6.56	13.0	14.0	14.0	30.0	47.8	41.6	22.9	64.82	227.5	136.88
May 23	5.10	7.89	4.27	17.80	7.51	12.0	15.0	14.5	47.6	74.7	41.6	15.8	297.79	231.3	120.50
May 25	3.37	6.17	5.10	.....	....	13.0	14.5	15.0	31.8	60.1	50.2	22.9	119.50	258.1	142.35
May 26	4.44	4.69	4.60	.....	....	13.0	14.5	15.0	41.9	45.7	45.3	25.1	107.36	232.0	158.78
May 27	2.88	5.26	4.60	.....	....	13.0	14.5	15.5	27.2	51.3	45.7	...	....	....	....
May 28	5.34	5.92	4.03	.....	....	13.0	14.5	15.5	50.2	57.7	40.1	...	....	....	....
May 29	4.11	4.85	4.60	.....	....	13.0	14.0	16.0	38.8	46.7	46.2	...	....	....	....
July 20*	3.95	...	2.06	61.6	19.58	16	...	18	39.70	...	21.59	...	....	....	....
July 20†	0.00	...	2.71	133.76	26.4	16	...	18	0.00	...	28.41	...	....	....	....
July 22§	0.00	...	5.26	268.95	13.09	15	...	18	0.00	...	55.14	...	....	....	....
July 22‡	4.52	...	5.42	68.20	17.82	15	...	18	44.53	...	56.81	...	....	....	....

*Taken at 11:30 a. m., 20 amp. treatment. †Taken at 1 p. m., 30 amp. treatment. §Taken at 10 a. m., 20 amp. treatment. ‡Taken at 11:15 a. m., 30 amp. treatment.

Date.	Parts per million of nitrogen as Nitrites. Raw sewage.	Nitrites. After electric treatment.	Nitrites. After sedimentation.	Nitrates. Raw sewage.	Nitrates. After electric treatment.	Nitrates. After sedimentation.	Free Ammonia. Raw sewage.	Free Ammonia. After sedimentation.	Total nitrogen Kjeldahl method, p.p.m. Raw sewage.	Total nitrogen Kjeldahl method, p.p.m. After sedimentation.	Turbidity, p.p.m. Raw sewage.	Turbidity, p.p.m. After sedimentation.	Color, platinum cobalt. Raw sewage.	Color, platinum cobalt. After sedimentation.
May 19	0.40	0.40	0.56	4.00	4.00	4.00	...	...	...	...	...	...	...	...
May 20	0.40	4.40	0.80	1.60	1.60	1.60	...	...	...	...	...	...	...	...
May 23	0.56	0.56	0.72	0.00	0.00	0.00	...	...	...	...	...	...	...	...
May 27	...	...	...	...	...	...	...	...	...	...	270	55	124	33
May 28	...	...	...	...	...	...	...	...	...	...	165*	33	100*	27
June 2	...	...	...	...	...	...	33.00	25.00	70.00	42.50	...	...	...	...

*After a heavy rain.

48 hours showed 1,100 bacteria directly after electrolytic treatment and 250 after passing through the sedimentation tank. On July 20, raw sewage showed 20,000 acid-producing colonies per c.c. and treated sewage 2 red colonies on lactose litmus after 48 hours' incubation. Other results on the several dates mentioned are shown by the accompanying table.

The cost of the process per million gallons is calculated by Mr. Firth to be as follows:

Electricity for electrolysis (not including pumping) at 3 cts. per kw. h.	$4.32
Lime (941 lbs. at $6 per ton, 97% calcium oxide)	2.83
	$7.15

No estimate is made of cost of attendance or of pressing and disposing of sludge, nor of overhead charges.

A larger plant is now being built to be installed at Elmhurst, about 20 feet long and 3 feet square, with vertical electrodes.

STREET CLEANING IN SAVANNAH.

At the beginning of this year there were in Savannah, Ga., 140,814 square yards of sheet asphalt pavement, and about 850,000 square yards of asphalt block, vitrified brick, Belgian block and cobblestone. The sheet asphalt streets are cleaned by use of a squeegee machine, which was purchased in 1913 at a cost of $1,250. The streets of Savannah are practically level and only light grades could be obtained for the storm sewer system; consequently, flushing dirt from the streets into the sewers by street flushing machines, so successful in many other cities, was considered undesirable here on account of the deposits which it was feared would occur in the sewers. This would be all the greater, because of the fact that the soil there is largely sand, which, while it is carried along by comparatively rapid gutter flow, is very quickly deposited when the velocity falls below a certain critical point.

With the squeegee, the dirt and refuse of the street is carried to the gutter only, where it is shoveled into carts and carried to the dump. The operation of this machine last year cost an average of 2½ cents per thousand square yards swept. Auxiliary cleaning is done by hand sweepers and scrapers, and the cost of this and the carting away of the refuse averaged 28 cents per thousand square yards; making a total of 30½ cents per thousand square yards for the total cleaning and sweeping. By these two methods there were removed from the sheet asphalt streets about four tons per day, or 570 pounds per thousand square yards. In order both that the machines may work advantageously and that there may be as little obstruction to traffic as possible, street sweeping is done at night, except during a part of the winter when the water would not dry quickly, and then it is done in the early morning.

The other kinds of pavement are cleaned by 2-horse sweeping machines preceded by a sprinkler, this work also being done at night. Cobblestone and other rough pavements are cleaned by hand sweeping, which also is employed on the smoother pavements as an auxiliary to the machine sweeper. The daily cost of operating the forces which clean these 850,000 square yards of pavement other than sheet asphalt, is $85, and the amount of refuse removed averages about 100 loads daily. Brooms operate six days without refilling, and the cost of refilling is $7 each.

At the beginning of 1913 there were 1,455 catch basins in the city, and eight were constructed during the year. The number of cleanings of basins during the year were 17,000, which gives an average of about 11½ cleanings per basin per year, or approximately one cleaning per month. This is a much better average than will be found in most cities, and would indicate that the basins are kept comparatively clean and effective. The approximate cost of these 17,000 cleanings was $8,800, "which cost will be materially reduced the coming year by introducing a more economical method of doing the work." The cost during 1913 was a little over 50 cents per cleaning, which may be considered low for this class of work.

The catch basins, averaging 1,459 in number, were oiled twice a month, and oftener, if necessary, from May to November, the object being to prevent mosquitoes breeding in them. Five thousand five hundred gallons of kerosene was used in this work last year, and the cost of the work was approximately $550.

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CHANGE OF ADDRESS
Subscribers are requested to notify us of changes of address, giving both old and new addresses.

Contributions suitable for this paper either in the form of special articles or of letters discussing municipal matters, are invited and paid for.
Subscribers desiring information concerning municipal matters are requested to call upon MUNICIPAL JOURNAL, which has unusual facilities for furnishing the same, and will do so gladly and without cost.

Statement of the ownership and management, required by the Act of August 24, 1912, of MUNICIPAL JOURNAL, published weekly at New York City, for October 1, 1914:
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Sworn to and subscribed before me this 1st day of October, 1914. H. H. MINER, Notary Public (No. 2439), [Seal.] New York County.
(My commission expires March 30, 1916.)

OCTOBER 15, 1914.

CONTENTS

Tank Treatment of Sewage.

A feature of the experimental sewage treatment plant at Cleveland (which is described on another page) which must attract the notice of every reader, is the attention paid to tank treatment of sewage. Including the grit chamber, thirteen tanks were employed, some of them in two or more ways; while three rapid filters or scrubbers, one sprinkling filter, hypochlorite apparatus, five sludge beds and two filter presses practically completed the equipment.

While grit chambers and even sedimentation tanks have been in common use in connection with all of the older land and filtration methods, their advance to first place practically began with the septic tank. The Germans seem to have devoted a larger percentage of their investigations to tank than to other methods of sewage treatment. The septic and Hampden tanks were invented by Englishmen, but the Imhoff, Kremer, Stiag, Spree, Foerster and others are variations produced by later German investigations. In fact, we may be still at the threshold of our knowledge of the possibilities of tank treatment and the details of design.

To only hint at the questions to be studied, these include means for securing uniform or gradually augmented or retarded velocity throughout the tank, with the preliminary decision as to which is desirable. The best method of admitting and removing the sewage is by no means settled. Why does scum form almost to the exclusion of sludge in some tanks and almost none in others? What depth should be given to a tank and what percentage of the capacity of a tank should the sludge be permitted to occupy? Sedimentation, septic action, digestion, gasification and various other chemical and biological actions take place in a tank. To what extent are these actions desirable and how do they interfere with each other, and should effort be made to separate them, and how? The two-story tank is an effort at such separation; several of the German constructions have the tanks entirely separated. Even of the Imhoff tanks there are a dozen or more designs as to detail.

To secure the best sedimentation, what shape and proportions are best, what velocity of flow, what depth? What allowance in depth should be made for sludge and how can the rates of flow be maintained as the volume of sludge increases?

In a digestion tank, should there be any fixed ratio between the sludge and the supernatant liquid? Does frequency of withdrawal of sludge affect the digestion of that remaining, and how? Should the formation of scum be avoided, and how? And finally, how do various characteristics of sewage affect the solutions of these several problems?

It is apparent that there is abundant opportunity for investigation of tank treatment. It is hardly to be hoped that the point will ever be reached where an engineer can, by inserting in a formula certain figures to represent known characteristics of a given sewage, solve the formula for each dimension and detail of the tank which will be most satisfactory, but we may approach it more nearly. We are now so far short of this point, and so ignorant of the effect upon operation which will be produced by variations in sewage composition, that tests made by experts with the sewage under consideration to determine what answers to such questions as the above will give the best results, are desirable wherever they are practicable.

Safe Limit of Stream Pollution.

Several states of this country which are separated by streams as boundaries have agreed to assist each other in preventing the pollution of these streams, so far as possible. This is generally known; but it is not so generally known that the United States and Canada, about two years ago, appointed an International Joint Commission to investigate the pollution of the boundary waters between the two as to its effect upon public health and their use for other purposes. This commission has just issued its first report, and one of its conclusions is that, while the seven million people who inhabit the cities and towns along these waters live under sanitary and climatic conditions which, exclusive of the public water supplies, are much better than the average for the country as a whole, and infinitely better than those in European cities, yet their typhoid rates are ten to fifty times those of the large cities of northern Europe.

This condition the commission attributes to three causes: Unrestricted discharge of sewage by municipalities and vessels; failure to purify polluted water, and inefficiency in such purification as is attempted. The

last is in some cases a matter of carelessness or dereliction of duty by an official. It has been found, for instance, that neglect to secure a pure effluent during a few hours at night produces almost as serious results in the health of the community as though continued throughout the twenty-four hours.

But, aside from this, the commission emphasizes a point which has heretofore received consideration by only a few, we believe, viz., that it is possible to overload a water filtration plant by increasing the bacterial pollution of the water applied. The commission believes that in certain localities the pollution of the water is so great as to impose an unreasonable burden upon any known method of water purification. In some parts of the Great Lakes and connecting streams as much as 34,000 B. coli per 100 c.c. were found, and even though a plant may adequately purify such water under ideal conditions the danger of a lapse from such condition is too great—the factor of safety is too small.

This naturally raises the question of maintaining the purity of streams from which water supplies are drawn. It has been argued that, since a city should filter any such water before using it, it is unnecessary to treat sewage discharged into it unless to prevent nuisance; the water filter will furnish the only protection needed.

It is, of course, realized that such a filter cannot be expected to furnish a potable effluent from sewage (although almost this has been effected in New England), and there must be some point beyond which it is dangerous to ask it to do so. If the discharge into a given stream of sewage beyond a certain amount or of more than a certain degree of pollution will carry the stream water beyond such danger point, then the sewage should be treated.

Given the proof of this theory and some method for determining the degree of stream pollution beyond which the efficiency of water filters is uncertain, and sanitarians have a sufficient answer to the argument referred to against the necessity for treating sewage.

STANDARDS FOR THE TURBIDITY OF WATER.*

The principle used for the preparation of turbidity standards as given in the reports of the Committee on Standard Methods of Water Analysis of the American Public Health Association, 1905 and 1912, i. e., that of correcting a standard determined by weight by the use of a field method, is like hitching the cart before the horse.

No two laboratories nor any two persons in the same laboratory working independently in the preparation of silica standards, following the procedure outlined, will make standards exactly alike.

A field method is never accurate and the description of what is "An observation in the middle of the day, in the open air, but not in the sunlight, etc.," is a source of many possible interpretations. The amount of light, the size, shape and color of the vessel, the fineness of the material, to say nothing of the personal equation, all influence the results.

What is needed is a definite procedure by which standards can be duplicated from time to time by different chemists without variation.

Such a method has been in use in the laboratories of this bureau since 1901. It involves the use of diatomaceous earth, prepared as follows:

"Wash with water to remove soluble salts; dry and ignite to remove organic matter; treat and warm with dilute hydrochloric acid; wash until free from acid and dry thoroughly. Grind in agate mortar, sifting through 200 mesh sieve and dry in desiccator."

Take a weighed amount of finely ground material, about two grains, suspend in 500 c. c. of distilled water, shaking vigorously from time to time for two or three hours. Suspend for ten hours, decant supernatent liquid. Dry and weigh residue. The difference equals the amount in suspension. Dilute to standard and use as stock.

I have found that standards made in this way from different stocks do not differ perceptibly. All material that remains suspended for ten hours appears to be of the same degree of fineness.

We add a small amount of a saturated solution of mercuric chloride and make standards as follows: Use quart bottles of a high grade of white glass free from air bubbles. The standards are 0, 0.5, 1, 2, 3, 4, 5, 7, 9, 11, 14, 17, 20, 23, 26 parts per million silica. For readings above 26, we use a special nessler jar with a ground glass stopper. We seal these standards. The 100 c. c. standards are 26, 32, 38, 44, 50, 65, 80, 95, 120, 150, 180. For turbidities above 180, dilutions are made with clear water.

During 1913, we made over 24,000 tests with these standards. We have standards made in 1907 still in use. These have been checked from time to time and have not been found to change. We would not recommend using standards over six months without checking.

This method while it is ideal for the preparation of standards which can always be duplicated, involves considerable labor in the preparation of the diatomacious earth. The introduction of Fuller's earth seems to be a step in the right direction. I believe this was first brought out by Dr. E. C. Levy of Richmond, Va., in a paper before the Laboratory Section of the American Public Health Association, although in the report for 1912, he is not given credit for it. The idea, of course, is to do away with the tedious grinding and to obtain a standard which resembles more closely the turbidity of water caused by clay.

Working then with two objects in view, of having a definite weight and a definite degree of fineness (obtained by suspension for a definite period) we have experimented with Fuller's earth and have prepared standards which check exactly with our standards made with diatomaceous earth. Our method follows:

If a 200 mesh sieve is not obtainable take about 20 grams of Fuller's earth; if a sieve can be obtained, take about 5 grams of the sifted material (weighing is not necessary). Place in a gallon bottle and add about a quart of distilled water, shake thoroughly, as above, and suspend for ten hours. Decant and determine the weight of the material remaining in suspension by filtering 100-200 c. c. through a weighed Gooch crucible. Dry and weigh.

It will probably be necessary to coagulate the material by the use of a known weight of hydrate of alumina or a solution of alum. In this latter case, the water should be alkaline to precipitate the alum.

The total weight will be the weight of the material in solution plus the weight of the hydrate of alumina.

We know then the degree of fineness as we have suspended for a definite period and we have a known weight. From this suspension we can make our stock for use in preparing our standards.

I do not know just how long the standards will keep, as the period elapsing since their preparation is relatively short compared with our other standards, but in any case it is a simple matter to prepare new ones.

*Paper before the Illinois Water Supply Association, by Francis D. West, Chemist in charge, Torresdale Laboratory, Philadelphia Bureau of Water.

The WEEK'S NEWS

Sacramento's Proposed $2,425,000 Roads—Federal Aid Highway in Maine—Colorado Convict Roads—$8,000,000 Boulevards for Chicago—Louisville, Ky., $2,000,000 Sewer Plans—Many Cities Suffer Water Famine—Cities Against Public Utilities—Commission, City Manager and Recall—Garbage Problems in West Orange, N. J., St. Louis, Mo., Spokane, Wash., and Holyoke, Mass.—Grade Crossing Elimination in Paterson, N. J., Lynn, Mass., and Philadelphia, Pa.

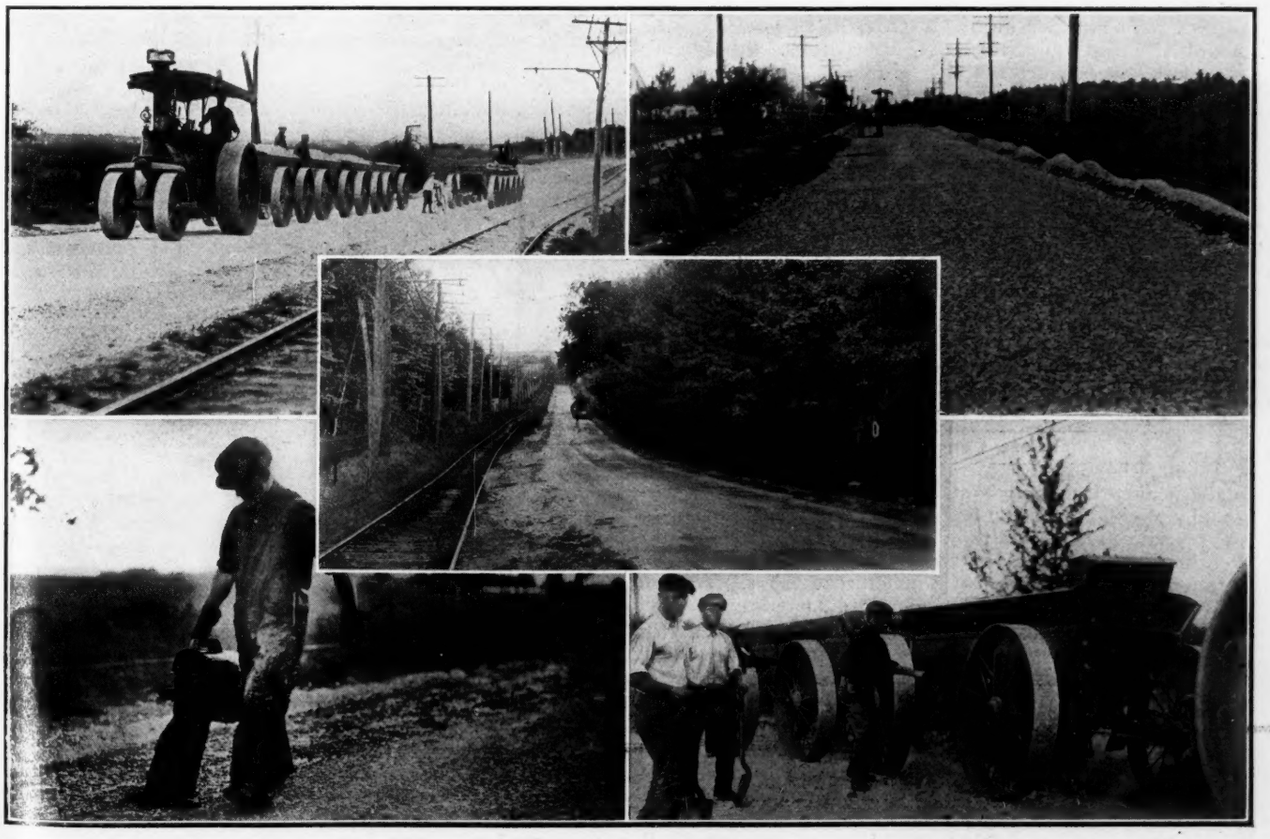
ROADS AND PAVEMENTS

Proposed $2,425,000 Roads.

Sacramento, Cal.—There are four types of roads under the proposed $2,425,000 highway bond issue on which the people of Sacramento County will vote this month. The highest type is to be of concrete cement with an asphalt wearing surface. This road has been planned for the main arteries to accommodate the great bulk of traffic leading into Sacramento City from the main lines of travel of the county and from other counties. Next in point of quality are the macadam and the gravel roads which will have asphalt wearing surfaces. These will take care of the county roads having a large amount of travel, and the other type is the plain macadam and the plain gravel roads for the less traveled sections. Seven roads altogether are proposed. The Sutter Island Road will be 6.02 miles long, 12 feet wide, and built of gravel, at a cost of about $5,220 per mile. The Fruit Ridge Road will be approximately 1.58 miles long, 14 feet wide, and built of macadam, at a cost of approximately $7,530 per mile. The Florin Road will be 3.38 miles long, 12 feet wide, and built of macadam, at a cost of about $6,350 per mile. There will be two reinforced concrete bridges on this road, cost of same to be approximately $5,650. The Valley Oaks Road will be approximately 4.14 miles long, 12 feet wide, and built of macadam, at a cost of approximately $6,330 per mile. There will be one reinforced concrete bridge on this road, cost of same to be approximately $2,000. The Brannan Island Road will stretch for approximately 3.88 miles, will be 12 feet wide and will be built of gravel, at a cost of $5,420 per mile. The Twitchell Island Road will be about 1.5 miles long, 12 feet wide, will be built of gravel, and cost about $5,240 per mile.

Federal Aid Road in Maine.

Portland, Me.—The federal aid highway between Portland and Brunswick will not be completed this fall, the contract having proved to be such a big one and such excellent work is being done in the way of straightening curves and reducing grades that much delay has been occasioned. Up to the present time between five and six miles of the 20 miles the contract calls for have been completed, and several more undoubtedly will be finished before the winter. Present indications are that the road should be done by July 1 of next year. Work on the highway is in progress at intervals for the entire 20 miles, the contract having been divided into sections. On the Falmouth section, which begins at Martin Point Bridge, at the Portland line and runs to Skillins Corner, about 1½ miles have been completed. On the Cumberland section, which begins at Underwood Spring Park and runs through the town



Courtesy, Portland (Me.) Evening Express and Advertiser.

FEDERAL AID ROAD IN MAINE.

Two "Trains" Carrying Material. Pouring the Tar. — Section of Completed Road. — Section of Crushed Rock Foundation. Dumping the Rock.

of Cumberland, about one mile of road has been completed, while a vast amount of work has been done in straightening out the dangerous curves and in taking off the top of the steep hill just west of Yarmouth. The present plan is to continue laying bituminous macadam until about Nov. 1, the weather permitting. After this date, the crews will be kept on digging ditches, putting down the shoulders and building culverts until the end of the year. This will bring the work to a point that will enable it to be completed easily during the early part of next summer. One contractor, R. F. Hudson, of Melrose, Mass., has the contract for the entire road. Being a federal aid job, the construction is in charge of the United States Government and E. O. Hathaway of the United States office of public roads is the chief engineer on the work. Each section is in charge of an engineering inspector working under the direction of Mr. Hathaway, who makes his headquarters at Yarmouth. The illustrations show different stages of the work in progress and a completed section of the road.

Studies Colorado's Convict Roads.

Canon City, Colo.—Colorado's system of convict-built highways will be investigated by the federal department, which has sent experts to this state to inspect the work and report upon the methods. Warden Tynan, of the penitentiary, is in receipt of a letter from L. W. Page, of the federal office of roads, stating that H. S. Fairbank, highway engineer, and Dr. W. F. Draper, past assistant surgeon of the bureau of public health, have been commissioned to visit Colorado as representatives of the government and take notes on road construction. They looked over the convict-built roads in Boulder and Larimer counties and then came to Canon City for an inspection of the Parkdale-Cotopaxi cut-off; the road to the top of the Royal Gorge; the Skyline drive and other highways made by prison labor in the Arkansas valley and in the Pike's Peak district.

Chicago's $8,000,000 Boulevard System.

Chicago, Ill.—The $8,000,000 boulevard link that is to unite the South Side boulevard system with Lincoln Park should be well under way by the first of March, according to a statement by Edward J. Glackin, secretary of the Board of Local Improvements. Mr. Glackin is preparing the special assessment roll that is to add $4,200,000 to the $3,800,000 that is hoped to be realized through the approval of a bond issue at the November election. Secretary Glackin said a clerical force will work night and day getting ready the special assessment lists. He says the task is greater than any that has been undertaken in years where quick results were called for. "There is scarcely any doubt of the passage of the bond issue," said Secretary Glackin, and City Comptroller Traeger says that the selling will be easy. The almost unanimous vote by which the City Council passed the link ordinance was the source of much pleasure to Mayor Harrison, who has been an advocate of the link measure for years. County Clerk Sweitzer announced that the $2,000,000 bond issue for good roads in Cook County under the Tice good roads law would go on the ballot at the November election.

More Convict Roads.

Joliet, Ill.—Edmund M. Allen, warden of the Illinois state penitentiary here, announced his intention of personally urging the state legislature at its next session to appropriate $100,000 for the immediate construction of the long-proposed Chicago-Joliet highway as a practical demonstration of the efficiency of convict road labor. Warden Allen declared that by using for road material the spoil banks of the drainage canal, parallel to which the prospective highway would run, he could build the road for a sum far less than has been hitherto estimated.

Kalamazoo, Mich.—Kalamazoo county's roads, built under the honor system, have been inspected and approved by officials from the state, national government, county and city. The inspection party included H. S. Fairbank, highway engineer; Dr. W. F. Draper, department of public roads, U. S. Department of Agriculture; State Highway Commisssioner Frank Rogers of Lansing; Mayor A. B. Connable, Aldermen Cutting, Ten Busschen, and Martin, Assessor Kennery, Circuit Judge Stewart, County Clerk Edward Curtenius and County Treasurer George Lawrence. The county is putting the convicts to work under the honor system, without an armed guard.

Rebuilding Sixteen Streets.

Wilmington, Del.—With sixteen paving jobs in progress, officials and employes of the Street and Sewer Department are expecting one of the busiest periods in the history of the department for some time. The work now under way will cost about $75,0000 and is being done by the city's paving plant under direction of Street Commissioner Frank W. Pierson. Close inspection is maintained to see that every yard of paving comes up to specifications. Announcement was made at the Street and Sewer Department offices that the work will last for about six months.

Charge Tearers for Street Repairing.

Waterloo, Ia.—The city council has just passed an ordinance regulating the tearing up of streets for laying underground conveyors. Hereafter this may not be done without a permit from the city engineer, which is issued only on a promise to put the street back promptly in its original condition in the case of unpaved streets and to pay beforehand all charges for repair as estimated by the city engineer in the case of paved streets. A schedule of prices for such repairs is included in the ordinance:

Repairing sheet asphalt pavement 1½-in. wearing surface, sq. yd. $3.25. Repairing asphaltic concrete pavement, 2-in. wearing surface, $3.25 sq. yd. Repairing sheet asphalt pavement, 2-in. wearing surface, $3.75 sq. yd. Repairing brick block pavement, concrete base, $2.50 sq. yd. Repairing brick pavement, 2 course, or macadam, $1.50 sq. yd. Concrete pavement, $2 sq. yd. Refilling trench, 50c. cu. yd. The minimum charge for repairing any sheet asphalt and any brick block pavement shall be $5, and the minimum charge for repairing ordinary brick and concrete pavement shall be $3.

To Hire Farmers for Road Work.

Seattle, Wash.—The Seattle Municipal League, through its street and roads committee, is undertaking to bring about reform in the matter of the maintenance and repair of the roads in King County. The plans of the streets and roads committee consist in promoting the use of the King split-log drag; the contracting by the county for the maintenance and repair of sections of road of one, two, three or more miles in length, with farmers of the neighborhood; the letting of these contracts by competitive bidding; and the effort to secure the co-operation of the county commissioners in the proposed reforms. To aid in the promotion of its plans, the streets and roads committee is distributing throughout the county blue-print plans and directions for the construction and use of the King split-log drag. One of these drags can be constructed, according to James E. Blackwell, the architect, who prepared the plans, at a cost of but $2 or $3, or but a fraction of the cost of the style of drag now used by the county.

Concrete Roads in Long Island.

Bay Shore, L. I.—Edward N. Hines, chairman of the Highway Commission of Wayne County, Mich., and A. N. Johnson, chief engineer of the Bureau of Municipal Research of New York and former State Highway Engineer of Illinois; L. Grossman, resident engineer of the New York State Highway Department directly in charge of the work being done here; C. S. Dorron, chief engineer of the Department of Parks, Brooklyn, in company with a party of road engineering experts, guests of Bertram A. Wait, division engineer of the State Highway Department, in charge of the construction of Long Island roads, inspected the South County road between here and Bellport. The Bay Shore-Brookhaven road, work on which has progressed as far as Oakdale, is being built at a cost of $1.12 per yard. The road is sixteen feet in width, but the Town of Islip has filled in from curb to curb with the same material in the center of the villages through which the South County road passes. The informal inspection made by the party took in the Patchogue-Moriches road, which is also under construction. Frank Arrigoni, of Middletown, Conn., has the contract. Forty-five miles of concrete road will have been completed by the end of this year on Long Island. In these two jobs most of the gravel and sand was local, dug from leased pits.

SEWERAGE AND SANITATION

Ohio to Quarantine Against Kentucky.

Cincinnati, O.—A quarantine against the entire State of Kentucky will be asked of the Ohio State Board of Health by Health Officer Landis, of Cincinnati, unless officials of Ludlow, Ky., satisfy him that reports of considerable scarlet fever in that town are untrue. Dr. C. W. Stroup, health officer of Ludlow, and Mayor Charles F. White deny that there is any epidemic. Dr. Landis said he had received information that there are at present 200 cases of the fever in Ludlow.

$2,000,000 Sewer Plans.

Louisville, Ky.—To carry out a comprehensive plan for extending the sewer system of Louisville, Mayor Buschemeyer will in all probability authorize an increase of several cents in the tax rate this year. Already $100,000, the equivalent of five cents in the levy, has been appropriated for sewers for this fiscal year. It is estimated that $2,000,000 will be necessary to complete the city's sewer system. In the past few years the tax rate has been without a levy for sewers because the money derived from the sale of the gas stock was used for this purpose. All of this $1,385,000 has been contracted for. The assessment of Louisville has been equalized as far as possible during the past four years by City Assessor Buechel, and the increase this year over the $212,000,000 assessment of 1914 will be between $2,000,000 and $3,000,000.

Progress of the New York Quarantine Station.

New York, N. Y.—In a preliminary report to Governor Glynn, it is shown that during the year ended Sept. 30 the usual annual deficit of the Quarantine Station was cut almost in half, and the prediction is made that the state health work of the port will soon be placed on a self-supporting basis. Health Officer O'Connell informs Governor Glynn that the Quarantine Station prevented the admission to New York of every case of quarantinable disease during the entire twelve months. One of the finest equipped laboratories in the world has opened in connection with the work of the station at Rosebank, S. I., at a total cost, when completed, of $91,000. Dr. O'Connell says that the deficit this year is only $49,970 as compared with $109,350 in 1911, $139,533 in 1912, and $96,078 in 1913. The lighting and water facilities on Hoffman and Swinburne Islands, where immigrants are detained and isolated, are bad, says Dr. O'Connell. Gasoline, costing $2,000 a year, furnishes the only means of lighting, and the only water obtainable is from wells on Hoffman Island, and this has to be carried by boats at great expense to Swinburne Island. The health officer wants a special appropriation of $40,000 to sink pipes, according to the Federal regulations, across the channel, thus obtaining water supply from Staten Island, and later from the new Catskill supply. This appropriation would also provide equipment for electric lighting. During the year 5,151 steam and sailing vessels and 1,505,375 passengers were inspected at Quarantine.

WATER SUPPLY

Water Famine Continues in Many Cities.

Elizabeth, N. J.—A serious scarcity of water is being felt throughout the State of New Jersey. If the dry weather continues the conditions will be very serious. The Elizabethtown Water Company has taken no steps to enforce the regulations in regard to the waste of water, but several million gallons, it is estimated, are being wasted daily. The water consumption in this city is about 14,000,000 gallons a day, according to the water company. According to the estimate of the State Water Supply Commission, which has fixed the allowance for every man, woman and child in a city or town at 100 gallons a day, only 8,000,000 gallons a day are necessary. The conditions which have brought about the threatened water famine are among the worst on record. The total rainfall for the month of September was only .26 of an inch, although the normal September rainfall is 4.05 inches.

Bound Brook, N. J.—The long-continued drought has seriously threatened the local water supply. Storage reservoirs of the water company are exhausted and wells from which water has been pumped for some time are now about dry, the drought having affected the ground waters as well as streams. With the approval of Mayor Packer, a warning has been issued by Fire Chief George O. Smalley calling on residents to exercise the greatest care to avert fires and not to use water unnecessarily.

New Brunswick, N. J.—The situation is grave. The water now being supplied the city free of charge by a local plant would cost thirteen cents a minute at the city price. Despite this the situation is not improving, because the 300,000 to 500,000 gallons of the reservoir supply which are saved daily as a result, are really inconsiderable, beside the 3,000,000 gallons daily consumption. The officials are attempting to reduce the consumption by a million gallons a day and are cutting off the supply from those found wasting it—but so far the figures remain about the same.

Eaton, O.—Superintendent Drove, of the municipal water works board, has issued a notice asking consumers to be sparing, because the supply at present at the station is alarmingly low. Pumps have been working overtime to keep a supply in the standpipe.

Brooklyn, N. Y.—With practically no prospect of rain, the fall of this year has been absolutely dry, with the exception of 0.2 inches of rain. While there is no immediate prospect of a water famine, the Water Department heads have announced a campaign to stop the unnecessary use of water. Circulars are to be sent to all water users urging economy and the fountains in all the parks and public places will be closed. The city supply of water is so low that the Department is buying water from concerns in Queens, and if rain does not come before winter that supply may be closed, as the reservoirs will be so low that the private companies supplying it cannot handle the city's needs. The Metropolitan Pumping Station has been reopened, but that does not supply but a few millions of gallons daily. Sewers all over the city are badly in need of flushing, the creeks used for sewage are far lower than usual and the danger to health from that source is becoming greater every day of the drought. While residents of Brooklyn have been warned against waste of water, owing to a shortage, Deputy Chief Engineer William V. Brush, of the Department of Water Supply, Gas and Electricity, said there is no danger of a shortage in Manhattan or the Bronx. The records show there are 76,670,000,000 gallons of water in the Croton system. Without any further rainfall Mr. Brush said those boroughs can be supplied, at the present rate of consumption, for twenty-six weeks.

Lima, O.—The special water committee which has been meeting continually since the beginning of the water famine has reported on proposed improvements in the water supply. In general the recommendations are for raising and strengthening the banks of the upper reservoir, both for safety and to increase the capacity; for means of more rapid pumping when water is available in the stream; for drilling of wells for an emergency supply; for measures to enable the officials to determine the exact consumption of water and what is in storage. It is recommended:

That present facilities be utilized as far as possible. That two pumps at the East Lima pump station, not now in use, be transferred to the upper reservoir, to be used in increasing the pumpage capacity there from 24 to 36 millions of gallons daily. That a concrete wall be constructed to protect the south bank of the reservoir where it is now in danger from the erosion of the stream. That the banks of the reservoir be raised by from 4 to 6 feet, especially the east and south banks, and properly strengthened, with the purpose of increasing the capacity of the reservoir. That the inner stone coating of the reservoir be covered with a mixture of cement and sand, called "grout" for protection against action of waves. That wells be drilled at the upper reservoir for a supply in case of emergency. That accurate gauges be placed at both the upper and lower reservoirs so that it may be ascertained how much water is in storage at any time. That there be fixed a mimimum stage of water, below which the stored supply shall not be allowed to fall. That a meter be placed at the East Lima pump station so that it may be definitely known how much water is pumped into the city. That the whole city of Lima be equipped with water meters at the earliest possible date. That the Lost Creek wells be

always kept in condition for use as necessity may demand, and that a monthly report be made to the city council of the situation so that the council and the public may have reliable information as to the water supply.

Reporting upon the present situation, the committee said that the test well in the gravel bed west of the city, six feet in diameter, was 12 feet deep. It was reported that the city is now getting 1,500,000 gallons daily from the Solar refinery, and that since the supply from the Custer quarry had now ceased, another line will be run from the refinery to connect with the six-inch line on Greenlawn avenue. It was reported that the reservoir in East Lima had gained three and one-half inches in the last five days, which is about two and one-half million gallons. The lower reservoir is said now to contain four feet of water, or about 25 million gallons.

North Adams, Mass.—The most serious situation in the water supply this year has developed the big Notch reservoir being practically empty and the artesian wells are not able to furnish more than one-third of the water necessary for domestic use. All the water that is now on hand is what is in the storage reservoirs and this is a very limited supply. Very little is coming from Broad brook and as the artesian wells furnish only about one million gallons in 24 hours as against the three millions used every day, the situation is exceedingly critical. This is partly due to the fact that the rainfall for September was much below normal for that month. In order to conserve the meagre supply on hand it has been decided to shut off the water supply all over the city until further notice, turning it on only from 11 to 11.30 in the forenoon and from 5 to 5.30 in the afternoon.

New Water Supply Opened.

Chehalis, Wash.—Mayor Coleman and Contractor Mitchell announce that the new pipe line is now completed. The main pipe line from the headwaters of the Newaukum River, 17 miles east of Chehalis, and the new reservoir in the city park are ready. The city owns the distributing system now. The completion of the pipe line and the turning in of the pure mountain water will mark the end of a long, hard fight. Much litigation has been encountered by the city, but the local authorities have triumphed in all cases before the courts.

Broken Main Brings Famine to Seven Cities.

Boston, Mass.—The cities of Chelsea, Somerville, Cambridge, Medford, Malden and Everett and two districts in Boston were subjected to a water famine for several hours through the breaking of one of the main arteries in the Metropolitan system. The break occurred in the Mystic river when a dredger dropped one of its holding piles on top of a 36-inch main. After the main had been cut off the districts were supplied through connections with other parts of the system.

Must Pay for Unmetered Water.

Kalamazoo, Mich.—A decision of the supreme court of Michigan, in which the verdict secured by City Attorney Marvin Schaberg against the Standard Paper Company for $15,842.07 was sustained. The damage covers the approximate cost of water consumed by the paper company which was illegally taken from the city by means of a by-pass around the city meter. The supreme court's affirmation of the judgment rendered by the circuit court jury in this city follows a litigation which consumed a period of over four years. With accrued interest, the total amount due the city from the Standard Paper Company is $18,216. The suit was the result of an investigation by a special water committee appointed by Charles Farrell, mayor at the time the investigation was being planned. Water Commissioner George Huston discovered clever devices used in connection with a fire pump. The case grew out of a discovery brought to light in 1910 that approximately 60 per cent. of the water pumped by the city for the four years previous could not be accounted for, and for which the city was receiving no revenue. An ordinance was passed requiring all water lines in the city to be metered. By elimination the Standard Paper Company was suspected. A Hersey detector meter was placed on the main and in 28 hours it was discovered that 31,780 feet of water had passed through pipes. It was discovered that a by-pass had been constructed around the city meter, and there were 27 different taps consuming water for the company's sprinkler system. The water pressure was maintained by the city water, rather than the water taken from the river, as supposed, and apparently indicated by the fire pump, operated in the plant. When the city main was shut off the pressure simultaneously dropped.

Water Waste Survey for Dayton.

Dayton, O.—John A. Cole and Edward S. Cole of New York, water supply experts, have been employed by the city commission upon the request of City Manager Waite to conduct a pitometer survey of the city water system for a consideration of $6,000. It is expected that this survey will take about 90 days. It was announced that the work will be begun without delay.

Expert for New Jersey Water Problem.

Paterson, N. J.—The Paterson Finance Commission has decided that the commission engage an expert to check up the figures of the State Water Supply Commission's appraisal of the East Jersey Water Company's properties, proposed to be purchased by the State for water supply in this city, Passaic and vicinity. The matter of the selection of an expert was put in the hands of City Counsel Edward F. Merrey, who will submit to the commission the names of several men. It is expected Professor W. A. Bemis, who led the gas investigation for this city and Passaic, will be appointed. It is likely that the City Commission of Passaic will decide to pay a part of the expert's fee.

STREET LIGHTING AND POWER

City Competing with Company.

Fort Wayne, Ind.—The municipal light plant's maximum rate will be dropped to five cents. It has just been reduced to six and the manager declares he will not wait until the Fort Wayne and Northern Indiana company meets the six-cent rate. The new six-cent rate will be sent to the public utility commission for approval as soon as Mayor Hosey has endorsed it.

Schools to Have Own Lighting Plants.

Pittsburgh, Pa.—The Pittsburgh Board of Education is preparing to establish electric generating plants in at least five school buildings. This move is said to forecast the end of the Board's relations with the Allegheny County Light Company. The Board contracts with the company to furnish light and electric power in 132 school buildings, but is unable to get a reduction in the rate below 5 cents per killowatt hour for light and from 2 cents to 3½ cents a killowatt hour for power. The company insists upon considering each school a unit and charging each separately while the Board insists that, as it is one of the biggest customers of the company all the schools should be considered a unit and the rate made accordingly. The Board is having plans drawn for unit power plants at most of the newer school buildings.

Wants Lighting Reduction.

New York, N. Y.—Commissioner Maltbie has determined to recommend that the Public Service Commission shall make a substantial cut in the cost of electric light to the ordinary consumer supplied by the New York Edison Company and the United Electric Company. At present it is 10 cents a kilowatt hour, and the reduction suggested will probably be 3 or 4 cents. The matter was brought before the commission two years ago by a complaint made by a consumer of the name of Stadtlander. Since then Commissioner Maltbie has been holding hearings, going into the earnings and investments of the company. It is the expectation of the commission that the New York Edison and the United Electric will announce on their own initiative a reduction in their rates. Their experts have been busy for some weeks in going over their accounts and have been making the involved calculations as to the investments in real estate and plant, which are necessary to ascertain what changes they can make without cutting too much into their profits. If they do not make this announcement, Commisssioner Maltbie is prepared, it is un-

derstood, to report to the commission that a reduction of at least 3 cents is justified.

Commissioner Maltbie is likely also to pay particular attention to the rates charged to large consumers. It has been the contention of the complainants in the Stadtlander case that in order to prevent competition the New York Edison Company has cut the rate to the big consumers to such an extent that he has been getting his light and power almost at cost, while the small man has been forced to pay an exorbitant rate in order to provide the profits on the company's investment. This policy, it was represented, was adopted by the electric light company on account of the danger of the establishment in favorable places in the city of isolated plants. It is believed that large buildings or groups of two or three large buildings could economically set up their own private plants if the price charged them by the New York Edison was not so low, and that it was to discourage this that the small men were sacrificed. Commissioner Maltbie also pointed out that there has been no reduction in electric light charges to the ordinary consumer for eight or nine years, when, as a result of the investigations made by the Hughes committee, the New York Edison cut its rates from 15 to 10 cents a kilowatt hour.

Profitable Municipal Plant.

Lodi, Cal.—The City Clerk's annual report shows that Lodi has cleared $17,183.22, on its municipal light and water system during the past year. The city owns property valued at $178,354 which includes the electric light and water plants and services. During the year the city received from the sale of water and lights, $47,174.93. It costs $37,916.93 to maintain these departments. In addition to this, improvements have been made to the plants amounting to $57,935.52, giving a real profit of $17,183.22.

City Takes Over Utilities Plant.

Sault Ste Marie, Canada.—This city has taken over the Tagona Water and Light Company. The employes of the former water and light company will not be on the city pay roll under the supervision of the water and light committee. The business of the water and light department will be run on the lines of the Hydro Electric, and the rates will be based on their schedule as per one hundred feet of floor space. It is the intention of the city to do away with the meter rental, which has been a source of contention in many places, and Hydro Electric being responsible for its disappearance from its operations throughout the province.

FIRE AND POLICE

Police as Lamplighters.

New York, N. Y.—Commissioner Williams, of Water Supply, Gas and Electricity, has a plan to employ members of the Police Department in a new capacity. He has suggested to Police Commissioner Woods that the members of the force be required to light and extinguish the 16,418 electric lights on the multiple high power circuits throughout the city streets, which would, he thinks, save the city $40,000 yearly. The lamps are lit and put out by men from the electric light companies, who pay between $35,000 and $40,000 a year for the job. Commissioner Williams believes it would not take the police more than half a minute to light and extinguish the lamps. Commissioner Woods is willing to co-operate.

Fire in New York Subway.

New York, N. Y.—The recent fire in the underground portion of the Lenox avenue division of the existing subway has been investigated by the Public Service Commission. A work-train, loaded with papers and other refuse which was being taken out of the subway, was run into by another train and caught fire as a result of the collision. The subway for blocks was filled with smoke and the Fire Department had difficulty in extinguishing the fire. Some apprehension was caused by the occurrence, and Commissioner Milo R. Maltbie, Acting Chairman of the Public Service Commission for the First District, issued a statement calling attention to the fireproof character of the subway and the precautions which the Commission has taken to prevent fires. The theory of the Commission is to make the subway fireproof and to keep it free of inflammable materials, so that if a fire should start it would have little or nothing to feed upon. The occurrence in question was most unusual, and was really due to the efforts made by the company to prevent fire, for the work-train was carting away papers and other refuse which, if allowed to remain in the subway, would become a fire menace.

GOVERNMENT AND FINANCE

Commission and Manager Form in Iowa Towns.

Des Moines, Ia.—Iowa now has nine commission cities and four general manager cities. The latter operate under a stretching of the powers of the city councils so that the city clerks are expanded into purchasing agents, etc. Only one new commission city has been added the past two years. There are 101 cities and 758 incorporated towns in the state at this time. Of these 466 are members of the Iowa League of Municipalities. Twenty-three new towns have been incorporated this year.

Recall at Work.

Portland, Ore.—Recall petitions bearing 10,000 signatures were filed here for the removal of the Mayor and two City Commissioners. Gross incompetency in discharge of their duties is alleged.

Town Manager in New England.

Norwood, Mass.—The town of Norwood, leading the way for all New England, voted, 660 to 403, to make the experiment of putting its affairs into the hands of a business manager. Automatically such offices as overseer of the poor, surveyor of the town, highway, water, sewer, park and municipal light commissioners, tree warden and others, went out of existence, their work to be done by the manager. By the terms of the new charter, establishing the office of business manager, the board of selectmen is increased from three to five, and these five are charged with electing the manager, at an annual salary of $2,500. Two of these selectmen are to serve for three years, two for two years and one for one year. Though the selectmen, as well as electing the manager, are over him, he in turn is the head of all town departments as far as business matters go, and is answerable only to the people, who have the power of recall after two months if 200 signatures to such a petition can be secured. All other elected officials are also subject to recall. The offices of clerk and accountant are consolidated and a finance board of three members to serve without pay, is provided for.

STREET CLEANING AND REFUSE DISPOSAL

Garbage Contract Specifications.

West Orange, N. J.—Provisions of a stringent character are included in the specifications for the scavenger work of West Orange. The easy-going methods which have prevailed during the time the work has been given out without competition are superseded by the most up-to-date requirements. The council has been paying $4,234 a year for the work, but recently added $1,400 to the allowance. Thereupon the Citizens' Union applied for a writ of certiorari and the action of the council appointing a scavenger as a "town official" under an ordinance was declared by Chief Justice Gummere to be illegal. The council then drew up a new set of specifications for the work under which bids are to be received. The contractor must have an office in the town with a telephone and a person in attendance from 9 A. M. to 4 P. M. If notified of the failure of an employe to remove garbage or ashes the same shall be removed within two hours. Garbage shall be collected from the curb line. All garbage shall be kept separate and collected in a different vehicle from the ashes, the garbage being collected in a water-tight covered wagon and not to be removed from one wagon to another in the specified limits of the town. It is provided that ashes shall be placed in a wagon which is covered and "properly con-

structed, so as to conceal the contents, and to prevent scattering on public streets or highways. Rubbish, papers, tin cans, etc., shall be considered as ashes." The wagons must not be overloaded, must be numbered and painted once a year and cleaned each day. The contractor must discharge employes guilty of neglect or insolence. The dumping grounds must be kept clean, and papers, tin cans, etc., must be covered with three inches of dirt. Another clause states that "if the work is not satisfactory the council may by resolution terminate the contract and the surety company be compelled to make good the damages the town shall suffer as a result of the breach of contract."

Garbage Dumping in St. Louis.

St. Louis, Mo.—City garbage is being dumped into the Mississippi river, below St. Louis. The plant of the Indiana Reduction Co., which held the five-year contract, was closed in July on account of the odors. The plant has been taken over by another company, which expects to reopen it shortly. Meanwhile it is expected that the Board of Public Service and the Municipal Assembly will arrange for the construction of a municipal garbage reduction plant.

Spokane's Garbage Problem.

Spokane, Wash.—Comparative figures on the cost of burning garbage in 14 cities have been received by Commissioner of Public Utilities C. M. Fassett from the New York bureau of municipal research. Commissioner Fassett states that Spokane next spring will face the problem of rebuilding its garbage incinerating plant because of the purchase of the present site by the Inland railroad, and the city council has allowed $3,000 available after the first of the year to make a survey as to the best methods to be pursued. The figures received show that the cost of burning garbage ranges from 62 cents per ton in Norfolk, Va., to $6.93 per ton in West New Brighton, Mass. The Spokane cost is between these figures, $3.02 per ton, with a total tonnage consumed last year of 3,664, while in Norfolk the tonnage consumed was 11,902 and in West New Brighton 2,240 tons. The Inland railroad has agreed to give $25,000 toward the rebuilding of the Spokane plant, and the city will bear the rest of the expense if the plant is modernized.

Auto Sprinkler Succeeds in Tests.

Butte, Mont.—One of the new KisselKar combination street sprinklers and flushers has demonstrated to the officials of Butte, Mont., that it can easily take the place of six horse-drawn street sprinklers during the day and four horse-drawn street flushers at night. The water tank used is made of steel and is of 1,000 gallons capacity. It is mounted on a 3½-ton KisselKar chassis, made by the Kissel Motor Car Co., Hartford, Wis., and is connected to a two-stage centrifugal pump, which is fastened to the main frame of the truck. A 2½-inch pipe connects the tank to the pump. From the discharge pipe one outlet goes to the sprinkler heads, which are located in front of the radiator, and one to a flushing nozzle located on either side of the truck just back of the front wheels. This construction makes it possible for the operator of the machine to see just what he is doing at all times.

City Garbage Collection and Piggery.

Holyoke, Mass.—Being favored by municipal officials, it is probable that the garbage collection will be done by the city next year if present plans mature. The collecting of garbage would be done by the city through the city farm where a piggery would be established. The city now pays close to $10,000 for collection. Not only would the greater part of this sum be saved, but it is expected that there would be a handsome profit from the sale of pork.

It is shown that the piggery could be established, garbage collected and the business carried on with little additional outlay from that now at the city farm. It is possible, according to the plan, that the additional $20,000 required by the relief department for next year's work could be raised in greater part from this plan, or at least the business could be developed so that the profit would be close to these figures in a few years' time. The city of Worcester cleared $30,000 in one year on the same plan as mentioned.

MISCELLANEOUS

Chicago's First Municipal Market.

Chicago, Ill.—Chicago's first municipal market has been opened for business. It is at Maxwell street and South Union avenue. Later the municipal market commission will add other marts for the benefit of producer and consumer. The success of this first venture will be watched with interest, as upon it may depend a radical departure in Chicago's municipal economics.

City Wins Tide Land Suits.

Oakland, Cal.—The City of Oakland cannot be stopped from constructing its sea-wall on the tide-flats because the wall will shut out water transportation for some firms, owning land adjacent to the high-water mark, according to a decision rendered by the State Supreme Court. An injunction was asked to prevent the construction of the sea-wall. The Superior Court of Alameda County sustained a demurrer to the complaint, and the Supreme Court now upholds this judgment.

Grade Crossing Elimination Report.

Paterson, N. J.—City Engineer Harold J. Harder has submitted to the board of finance an exhaustive plan under which the grade crossings along the line of the Susquehanna railroad may be eliminated. According to the report the total cost of such work, by depression of tracks amounts to $2,772,678.08. To elevate the tracks the cost would be $2,587,000. The estimates are much higher than the contemplated cost of the elimination of the tracks along the line of the Erie railroad. For the past two months Edward Ryan, who was engaged as a special engineer to assist in the work, has been surveying and securing grades. In addition to the report submitted there are a large number of plans. These will, in turn, be presented to the public utility board with an application that the work along the lines of the Erie and Susquehanna railroads be carried out at the expense of the railroad companies. The bridges over the streets will be of the through plate girder type, with waterproofed trough floors. Those carrying the streets over the railroad will be of a similar type, except for those streets whose intersections come in the railroad right-of-way, where the bridges will probably consist of concrete arches, thrown between heavy beams extending from one abutment to the other. On account of the angle of the streets the girders of a through bridge would interefere with the traffic in these cases.

Flood Protection Plans Reported.

Indianapolis, Ind.—W. K. Hatt, engineer of the Indiana flood commission, named by the Governor to study flood conditions in the state and make recommendations to the 1915 legislature regarding proper flood prevention methods, has made his report to the commission. The report was of a general nature, detailed surveys and studies being necessary before works can be constructed. The completion of a topographical map of Indiana, at a cost of $500,000, and the installation of sixty-one stream gauging stations, at $150 a year, are recommended, one-half to be paid by the state and one-half to be paid by the federal government. The engineer found that the rainfall follows a determined cycle of thirty-four years. It appears that we have been passing through a series of years of deficient rainfall, and may expect in the near future years heavy floods. These will be accentuated because of the increased drainage of the farm lands, and the increased obstruction in the river beds near cities.

Key maps for flood protection plans recommended for various cities illustrate the construction of standard flood protection works. These are for Peru, Ind.; Ft. Wayne, Ind.; Kokomo, Ind.; Indianapolis, Ind.; Columbus, Ohio; Miami Valley, Ohio; Lima, Ohio; Marietta, Ohio; Brevoort levee district, near Vincennes, Ind. Contour map of Indiana is presented as the first attempt to picture the topography of the state of Indiana on a map of this kind. It was prepared by the use of the profiles of the railroads and by the use of existing surveys. The use of this map is in determining the drainage area and slope of the

streams. Co-operation should obtain between the state and the federal United States geological survey, to complete the survey of the state.

The report contains a summary of recommendations regarding the engineer's part of the work of the commission in which the following are advocated: The employment of a publicity agent; the publication of a resume of the information obtained by the investigation; field trips to determine the status of county bridge openings and other local flood problems; that the legislature be asked to cooperate with the United States geological survey for a topographical map and stream gaugings; that the services of the commission be offered to communities in flood protection plans; that legislation be recommended providing control of bridge openings by some state authority.

Local Products for New City Hall.

Pittsburgh, Pa.—The Allegheny county commissioners have adopted a resolution presented by Mayor Joseph G. Armstrong, referring to the building of the $3,000,000 court house and city hall, work on which was started October 1, that "It is the sense of this commission that all material used in this building shall be purchased wherever possible from manufacturers who produce in the vicinity of Pittsburgh, and all labor employed in these contracts on actual construction be obtained or taken from Allegheny county wherever possible."

San Francisco Twin Peaks Tunnel.

San Francisco, Cal.—Hans Pederson's bid for $3,475,300 for the construction of the Twin Peaks tunnel has been approved by the city officials and the contract awarded by the Board of Public Works. City Engineer O'Shaughnessy says that in figuring on the work Contractor Pederson has followed his estimates of cost closely. Notices to vacate are being served by the City Engineer on tenants on the tunnel right of way from which all houses must be moved. Only two pieces of property are to be condemned, the owners of the others having accepted the city's terms.

To Drill Municipal Oil Well.

Calgary, Alberta.—Having successfully operated the waterworks street railway and electric light power systems as municipal enterprises, the city council of Calgary is now asking the legislature for amendments to the charter whereby the drilling of an oil well will be permitted also. There are now thirty-five wells being drilled in various parts of the oil field and the indications are so good that the aldermen feel they should be in a position to take advantage of the opportunity to strike a flowing stream of gasoline.

Grade Crossing Elimination in Lynn Completed.

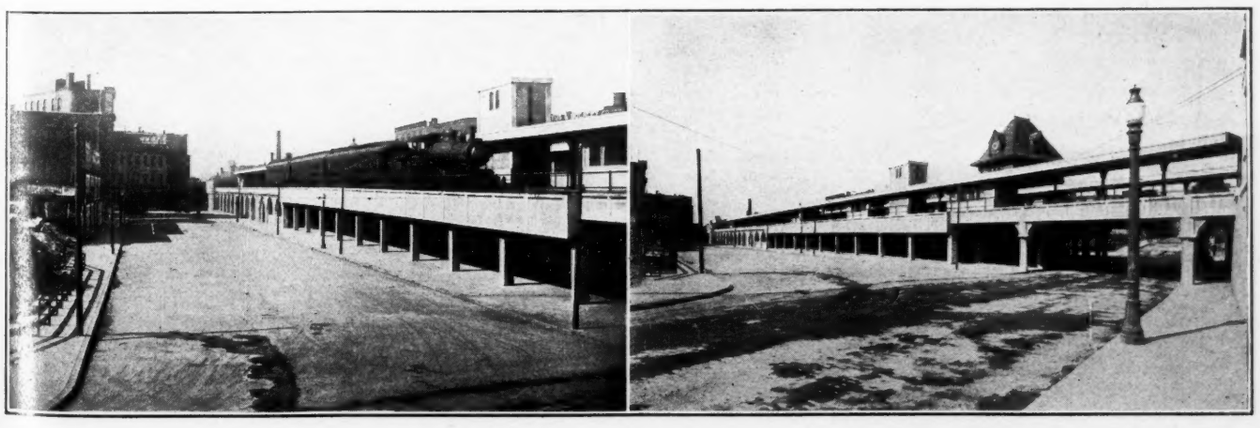
Lynn, Mass.—Silsbee and Mt. Vernon streets have been opened to traffic, following the completion of grade crossing eliminating operations. Mt. Vernon street is looked upon by the city officials as the most imposing thoroughfare in the city. The street under the Boston & Maine Railroad tracks was depressed after a five-year controversy between the city and the railroad. The illustration shows two views of the crossing and both streets.

Crossing Elimination for Unemployment Relief.

Philadelphia, Pa.—Another practical solution of the problem of providing for the unemployed came from Mayor Blankenburg by the suggestion that if the Finance Committee will release ordinances it has held since early summer for a grade-crossing removal work hundreds of men would find work. $2,000,000 would be expended and the "Chinese wall" of the northeast section of the city be removed. Just as he prodded councils recently in a message urging an appropriation of $50,000 that 446 idle street workers might be taken back, he will at the next meeting of councils urge the approval of the ordinances that are holding up the big improvement. The Committee on Steam Railroads has approved the ordinances for street openings, before the summer recess, but the Finance Committee is holding the measures. Loan funds provided for the purpose has been lying idle since 1911. Both the Pennsylvania and the Reading Companies entered into agreements of the elevation of the tracks, and the ordinances were put through councils, conveying the agreement and the mayor signed the bills. The causes for the hold-up in the Finance Committee are unknown, but the mayor will ask for action, as a practical means to getting under way as much work as possible and providing employment for men who are now idle. Councils' committee have met to confer with the organized charities as to the best means for providing help for the idle. R. H. Little, president for the Society for Organizing Charity, says 50,000 persons were aided last winter, with $165,000, and $150,000 will be needed this year.

Urges Relief for Unsanitary Housing.

Philadelphia, Pa.—Again urging councils to make an appropriation for the organization of a Division of Housing and Sanitation as a branch of the Department of Health, Director George W. Norris, of the Department of Wharves, Docks and Ferries, as president of the Philadelphia Housing Commission, has addressed letters to the presidents of select and common councils calling attention to the act of legislature which created the division. The act of assembly was approved by Governor Tener on July 22, 1913, and while legal opinions have stated that it was mandatory for councils to make an appropriation no funds have yet been set aside. Numerous requests have been made by Mayor Blankenberg, the Department of Public Health and Charities, City Solicitor Ryan, the Philadelphia Housing Commission and philanthropic associations—but the councils remain unhearing. By the failure to provide necessary inspection service and the hampering influence of the present inadequate clerical force, less than 50 per cent of over 2,800 nuisances and violations of housing laws reported by the office to the Bureau of Health so far during 1914 have been abated. Furthermore, certain provisions in the tenement law of 1895, which would be repealed by the new Housing Code, are not and never have been thoroughly enforced. Were this old law of 1895 enforced as it stands, 60 per cent of the tenements of this city would have to close. Through the inactivity of the councils this old law of 1895 still remains on the statute books and the city is knowingly violating the law.



Courtesy, Lynn (Mass.) Daily Evening Item.

TWO VIEWS OF GRADE CROSSING ELIMINATION IN LYNN COMPLETED.

THE MUNICIPAL INDEX

In Which Are Listed and Classified by Subjects All Articles Treating of Municipal Topics Which Have Appeared During the Past Month in the Leading Periodicals.

It is our purpose to give in the second issue of each month a list of all articles of any length or importance which have appeared in all the American periodicals and the leading English, French and German ones, dealing more or less directly with municipal matters. The index is kept up to date, and the month of literature covered each time will be brought up to within two or three days of publication. Our chief object in this is to keep our readers in touch with all the current literature on municipal matters. In furtherance of this we will furnish any of the articles listed in the index for the price named after each article, except that where an article is continued in two or three issues of the paper, the price given is for each of said issues. In addition to the titles where these are not sufficiently descriptive or where the article is of sufficient importance, a brief statement of its contents is added. The length also is given, and the name of the author when it is a contributed article.

ROADS AND PAVEMENTS.

Road Improvements in the North of Ireland. By J. W. Leebody, County Surveyor. 1½ pp., Surveyor, August 21. 40 cts.

Recent Road Improvements in Hawaii. Construction in territory where rainfall is excessive and soil scant; maintenance. By M. J. Adams, chief engineer. Ill., 2½ pp., Engineering Record, September 26. 10 cts.

Improved Road Surfacing in Stirling. Methods of laying and approximate prices for various kinds of material. By Andrew H. Goudie. 1 p., Surveyor, September 4. 40 cts.

Road Construction Methods in Norwich, Eng. Methods of reconstruction of main streets of the city. By A. E. Collins, city engineer. ½ p., Surveyor, September 18. 40 cts.

Modern Methods of Road Construction and Maintenance. The first of a series of articles containing communications from readers embodying the results of their experience with the methods of road construction. 1¾ pp., Surveyor, September 4; the second of the series; 2½ pp., September 11. 40 cts.

Selection of Pavements for Roads and Streets. General article. By W. H. Connell, Bureau of Highways, Philadelphia, Pa. 2 pp., Contract Record, September 2. 10 cts.

Experiences in the Recent Methods of Road Construction in Liverpool. With specifications for pitch macadam, pitch grouting, wood paving and oil macadam. By J. A. Brodie, city engineer. 1 p., Surveyor, September 11. 40 cts.

What Its Highways Mean to New York. Relation of 5,000 miles of improved highways to the automobile traffic. By R. K. Fuller. Ill., 2 pp., The Highway Contractor, September. 10 cts.

Great Activity in Pennsylvania State Highway Work. A summary of the work authorized, begun or completed during the past year. By G. D. Steele. 3 pp., Better Roads and Streets, September. 15 cts.

Annual Report of Philadelphia Bureau of Highways. Ill., 5 pp., Better Roads & Streets, October. 15 cts.

Road Construction at the Ashokan Reservoir of the New York City Water Supply. Ill., 8 pp., Good Roads, September 5. 10 cts.

Private Road over Seven Miles of Marsh and Loose Sand. Difficulty of hauling material over soft ground; transportation by narrow gauge railroad. Ill., ½ p., Engineering Record, October 10. 10 cts.

Report on Condition of Famous Chicago Road. Sheridan road is too narrow, grades are too steep and there are many jogs and turns that should be eliminated. 1 p., Engineering Record, September 12. 10 cts.

Economic Factors Involved in Road Construction in Strictly Rural Sections. 2½ pp., Engineering and Contracting, September 9. 10 cts.

Pavement Economy. Some of the important factors in the economy of pavement, especially as to the necessity of taking local conditions under full consideration. By H. B. Pullar, Engineering Chemist. Ill., 7 pp., Municipal Engineering, September. 25 cts.

Economy of Wide Roads. Showing the comparative cost of roads of various widths. By Thomas Adams, Sr., Advisor Local Government Board. 1 p., Contract Record, September 15. 10 cts.

Legislation, 1914 Highway. Changes in and additions to the road laws of New York State. 2½ pp., New York Highway News, September. 5 cts.

Convict Labor and Convict Camps on State Road Work in New Jersey. By Geo. D. Steele. Ill., 3 pp., Better Roads and Streets, September. 15 cts.

Bituminous Surfaces and Bituminous Pavements, Modern. Methods of construction of bituminous macadam, gravel, and concrete pavements. By A. H. Blanchard, Professor of Highway Engineering, Columbia University. 2½ pp., Surveyor, September 4. 40 cts.

Some Practical Notes on Design and Construction of Bituminous Surfaced Roads in England. Covering methods of application, thickness of crusts, surface treatment with tar, foundation, and miscellaneous details. 2 pp., Engineering and Contracting, September 9. 10 cts.

Asphalt Pavements, How to Repair. General article, telling of defects in asphalt pavements and how to correct them. 1 p., The Contractor, September 1. 20 cts.

The Municipal Asphalt Plant of the City of Chicago. By W. G. Leininger, superintendent Bureau of Streets. Ill., 7 pp., Good Roads, September 5. 10 cts.

The Municipal Asphalt Plant of Chicago. Methods used in repairing streets with cost compared with those charged by contractors. By W. G. Leininger, superintendent of streets. Ill., 6 pp., Municipal Engineering, September. 25 cts.

Resurfacing One Mile of Detroit Road with Old Material. How a penetration asphalt surface was torn up and relaid as asphaltic concrete. Ill., ½ p., Engineering Record, September 19. 10 cts.

Preparing Macadam Roads for Asphalt Topping in Chicago. Methods involving the use of portable asphalt plant. Force required, cost and quantity of work. Ill. ½ p., Engineering Record, October 3. 10 cts.

Westrumite Pavement and Its Cost. Short article with description of materials used, method of laying and approximate cost. By T. H. Boorman. 1½ pp., The Highway Contractor, September. 10 cts.

Roemac Macadam Road, Details of Construction of a. With specifications for laying. By Geo. D. Steele. Ill., 4 pp., Better Roads and Streets, September. 15 cts.

Broken Stone Roads, Methods of Constructing, on Sand. General article. By W. R. Farmington, engineer, Massachusetts Highway Commission. 2 pp., Better Roads and Streets, September. 15 cts.

Concrete Pavements Laid Against Car Tracks. Ill., ¼ p., Engineering Record, September 19. 10 cts.

Constructing Concrete Road in Maryland. A description of equipment and organization of the work; use of narrow gauge railroad. Ill., 3 pp., Municipal Journal, October 1. 10 cts.

Concrete Highway Construction at Montreal, General description of the work. Ill., 1 p., Contract Record, September 23. 10 cts.

Shoulders for Concrete Roads. By W. W. Crosby. 1 p., Surveyor, September 4. 40 cts.

Shoulders for Concrete Roads. 1 p., contract Record, September 30. 10 cts.

How Hassam Concrete Paving is Laid in Portland, Maine. Analysis of methods used with suggestion on economical handling of materials. By Daniel J. Hauer. Ill., 2 pp., The Contractor, October 1. 20 cts.

Industrial Railway for Conveying Materials in Concrete Road Construction. Covering methods used, equipment needed and cost. Ill., 4 pp., Concrete-Cement Age, September. 15 cts.

Slag as a Road-Surfacing Metal. General article. By F. S. Strong, division engineer, New York State Highway. Ill., 2 pp., New York Highway News, July. 5 cts.

Durax Granite Pavement. By J. H. Warburton. Ill., 1½ pp., Better Roads and Streets, October. 15 cts.

The Present Status of Small Cube Granite Block Pavements. Ill., 2½ pp., Engineering News, September 10. 15 cts.

Brick Specifications, New Paving. Recently revised by the National Paving Brick Manufacturers Association. Ill., 2½ pp., Good Roads, September 5. 10 cts.

Turning Brick Pavements. Methods employed to reduce cost of paving in Savannah. ¼ p., Municipal Journal, October 1. 10 cts.

Development of Vitrified Brick Pavements. Methods of manufacture and laying; standardizing tests. 2 pp., Municipal Journal, October 1. 10 cts.

Road Oil Specifications and Tests. 1½ pp., Canadian Engineer, October 1. 15 cts.

The Relation between the Melting Point and the Viscosity of Refined Tars. By Philip Sharples, Barrett Mfg. Co. 1½ pp., Better Roads and Streets, September. 15 cts.

Methods of Unloading Tank Cars. Details which can be utilized in the design of plants for unloading road oils, etc. By Philip Sharples. Ill., 5 pp., Municipal Engineering, October. 25 cts.

Maintenance Experience with a Bituminous Top Concrete Automobile Highway. Ill., 3 pp., Engineering News, September 17. 15 cts.

Highway Maintenance and Repair in Chicago. Use of income from wheel tax; cost of maintenance; amount of work done on each kind of pavement; resurfacing macadam with asphaltic concrete. Ill., 3¼ pp., Municipal Journal, October 1. 10 cts.

Maintaining Macadam Highways. Table showing cost of oiling various kinds of road. By E. A. James. Ill., 2½ pp., American City, September. 25 cts.

Costs, Road Surfacing, in Niagara Falls Park. Interesting cost data gathered in connection with a five-mile stretch of macadamizing. 1½ pp., Canadian Engineer, October 1. 15 cts.

Waves in Road Crusts. Extracts from discussion at a meeting of the American Society of Civil Engineers. 1 p., Surveyor, September 11. 40 cts.

Harmonic Waves in Road Crusts, Probable cause of waves or humps in roads. Ed., 1 p., Surveyor, September 11. 40 cts.

Specifications, Plans and Instructions. Detailed account of the preparation of standard specifications and the adoption of a new method in making surveys and plans. By Geo. A. Ricker. 1½ pp., New York Highway News, September. 5 cts.

Opening of Streets to be Regulated in Boston. 1 p., Better Roads and Streets, October. 15 cts.

Materials, Petrographic Range of Road Building. Technical article on occurrence of stone suitable for road building in various parts of North America. 2 pp., Canadian Engineer, September 3. 15 cts.

Accurate Methods of Making Field Tests of Sand-Clay Mixtures. 1½ pp., Better Roads and Streets, September. 15 cts.

Gutter Construction for Streets and Roads. By T. H. Boorman. 1 p., Canadian Engineer, September 24. 15 cts.

Curbing in Columbus, Natural Sandstone. Reasons for continuing use; more durable and ornamental. By Henry Maetzel, Engineer, Department Public Service. ¾ p., Municipal Journal, October 1. 10 cts.

Railway Crossings, Dangerous. Their relation to our public highways. Ill., 5 pp., Ohio State Department Monthly, July. 10 cts.

SEWERAGE AND SANITATION.

Sewage Disposal at Bergedorf, Germany. A description of the Emscher tank, sprinkling filters and settling tanks. By Kenneth Allen. Ill., 5 pp., Municipal Engineering, September. 25 cts.

Fitchburg Sewage Disposal Plant. A complete account of the settling tanks, sprinkling filters and secondary tanks, with detail plans and contract prices. Ill., 5 pp., Municipal Journal. September 17. 10 cents.

Liberty Sewage Disposal Plant. Description of plant with modifications and extensions during fourteen years of operation. Ill., 1½ pp., Municipal Journal, September 17. 10 cts.

Mount Gretna Sewage Plant. Design and operation of works where tank effluent is applied to slag filters by splash plates. By M. H. Matthes. Ill., 1 p., Engineering Record, October 3. 10 cts.

Auchterderran, Fife, Sewage Works. Difficulties of construction in a coal mining district. 1 p., Surveyor, September 18. 40 cts.

Operation of Sewage Disposal Plants. Chemical precipitation; disposal of sludge. The ninth of a series of articles by F. E. Daniels, State Board of Health of New Jersey. Ill., 2½ pp., Municipal Journal, September 17. 10 cts.

Electrolytic Sewage Treatment. Scientific article. By M. E. Connelly, President of the Borough of Queens. 6½ pp., Municipal Engineering, October. 25 cts.

Electrolytic Treatment of Sewage. Ed., ¾ p., Engineering Record, September 19. 10 cts.

Report of Electrolytic Sewage Treatment at Elmhurst. Operating results for 25,000-gallon per day plant. 1½ pp., Engineering Record, September 12. 10 cts.

Sewerage Scheme and Outfall Works, Cleethorpe's New. Description of the old system and plan of the new. By John Alford. 3 pp., Contract Journal, September 30. 15 cts.

A $35,000,000 Sewerage System. Description of Baltimore system; regarded the most scientific in the world. Ill., 3 pp., Manufacturers Record, September 3. 30 cts.

The First Unit of Vancouver and Districts' Great Sewerage Scheme. Ill., 2 pp., Contract Record, September 2. 10 cts.

Mill Creek Sewer System in St. Louis. History of the $3,000,000 pressure tunnel project; details of construction with cost and repair charges; projects for relief. By W. W. Horner and Leland Chivvis, St. Louis Sewer Department. 2½ pp., Engineering Record, October 3; Study of rainfall and runoff with relief sewers; investigation of hydraulic gradient. Ill., 3½ pp., October 10. 10 cts.

Rain Runoff Diagram, Kansas City. Curves developed for sewer design, combining the study of local conditions with values and methods used elsewhere. By R. S. Beard. Ill., 1¼ pp., Engineering Record, September 19. 10 cts.

Design of New and Relief Sewers. Technical article. Ill., 6 pp., Canadian Engineer, September 17. 15 cts.

Notes on the Design of Sewerage Regulators and Storm Water Overflows. 1½ pp., Canadian Engineer, September 10. 15 cts.

Explosions in Sewers. A study of the action of gasoline vapors. By O. Hufeland. 1 p., Engineering Record, September 12. 10 cts.

Sanitation of a Health and Pleasure Resort. Methods employed by the authorities of a health resort. By Thomas Sanderson. ½ p., The Surveyor, August 28. 40 cts.

Modern Sanitary Fallacies. 1¼ pp., Municipal Journal, September 17. 10 cts.

Relative Values in Sanitation. By Geo. C. Whipple, consulting engineer, New York City. 3½ pp., Contract Record, September 23. 10 cts.

Construction, Outfall Sewer. Technical article. By James Munce, M. I. C. E. City surveyor, Belfast, Ireland. 1¾ pp., Canadian Engineer, September 24. 15 cts.

Building Concrete Trunk Sewer for Chicago Suburbs. Work done by steam shovel, trenching machine and concrete plant. Ill., 4½ pp., Contractor. October 1. 20 cts.

Concrete Drain Tile. Covering methods of mixing the concrete and making curing and laying the pipe. 1½ pp., Cement and Engineering News, September. 10 cts.

Sampling of Sewage and other Liquids. by J. B. Kershaw, M. A. S. C. E. 3 pp., Surveyor, August 21. 40 cts.

WATER SUPPLY.

Water Works from Fire and Insurance Standpoints. By J. B. Rider, C. E. One of a series of articles. 2 pp., Fire and Water Engineering, September 23. 10 cts.

Water Works and Street Lighting in Wenatchee. By Charles T. White, water commissioner. Ill., 1½ pp., American City, September. 25 cts.

Some Water Works Engineering Mistakes. By D. H. Maury, consulting engineer. 1 p., Engineering and Contracting, September 9. 10 cts.

Ottawa Water Distribution. Review of tests of the efficiency of the system together with detailed estimates of the cost of improvements recommended. 2½ pp., Canadian Engineer, September 10. 15 cts.

Water Supplies in Kansas. Descriptive article. ½ p., Municipal Journal, September 24. 10 cts.

Rumford's New Water Supply. ½ p., Municipal Journal, September 24. 10 cts.

Light and Water Plant of Opelousas, La. Description of difficulties with lighting and water works plant in a small city and the methods used in removing them. By A. C. Jones, superintendent. Ill., 4½ pp., Municipal Engineering, September. 25 cts.

Ottawa River Water Supply. A summary of the proposed water system for Ottawa. ¾ p., Contract Record, September 9. 10 cts.

Report on Knoxville Water System Improvements. Covering design and construction of the present plant and recommendations for improvements in the future. Ill., 2 pp., Fire and Water Engineering, September 9. 10 cts.

Convention of New England Water Works Association. Covering meter rates, statistics of water purification plants, water main leakage and electrolysis mitigation. 3¾ pp., Engineering Record, September 19. 10 cts.

Reservoir, Steam-Shovel Work at Ashokan. Excavating and hauling six million cubic yards of backfill from borrow pits. Ill., 2 pp., Engineering Record, October 3. 10 cts.

Drilling Performances at the Kensico Dam. By W. L. Sanders. Ill., 5 pp., Water and Water Engineering, September 15. 15 cts.

How the Fall Creek Dyke was Built at Indianapolis. Critical review of the methods employed on the various parts of the work. By D. J. Hauer. Ill., 2½ pp., The Contractor, September 1. 20 cts.

Design of Small Waterworks Systems, The Efficient. Covering future requirement, fire protection, pressure, size of mains, pumping engines, reservoir, thickness of pipe and depth of cover for pipe lines. 3 pp., Contract Record, September 9. 10 cts.

Meters at Milwaukee Water-Works, Curtailment of Water Waste and Selection of. 2 pp., Contract Record, September 2. 10 cts.

Diaphragm Measurements of Water in Open Channels. Description of devices used in the measurement of large quantities of water. By C. W. Weidner. Ill., 2½ pp., Engineering News, September 10. 15 cts.

Concrete in Water Works Construction, Use of. General article. By E. B. Kay. 5 pp., Water Supply, September. 20 cts.

Filters, Harrisburg Mechanical, Do Not Infringe Negative Head Patents. Decision and comment of Judge Hunt in Court of Appeals. 1½ pp., Engineering Record, September 26. 10 cts.

Baltimore Water Works Extension. At a cost of $5,000,000. An abundant supply of filtered water is being procured. By E. B. Whitman. 3 pp., Manufacturers Record, September 3. 30 cts.

The Smith System of Natural Slow Sand Filtration as Applied to Parkersburg, and Proposed for Wheeling, W. Va. 2 pp., Engineering and Contracting, September 9. 10 cts.

The Use of Lime in Water Purification. A general review of the advantages and use of lime in recent American plants with particular reference to studies and practice at Columbus. By C. P. Hoover and R. D. Scott. 2 pp., Engineering News, September 17. 15 cts.

Practical Talks on Water Purification. Covering the bacterial content of waters; the necessity and methods of purification and the relation of B. Coli to polluted waters. By C. H. R. Fuller. Ill., 7½ pp., Water Supply, September. 20 cts.

Ultra-Violet Rays, Purification of Water by. Producing the rays; their effect; apparatus employed. By M. von Recklinghausen. Ill., 1½ pp., Municipal Journal, September 24. 10 cts.

Pure and Wholesome Water. Second and last installment of an article consisting of discussion by several experts of the standards of purity for public water supplies. 6½ pp., Water and Gas Review, September. 20 cts.

Water Softening at Port Tampa. A plant with a capacity of 10,000 gallons per hour; treatment of the hard and ill-smelling sulphur water. By Hiram McElroy, city engineer. Ill., 2 pp., Engineering News, September 17. 15 cts.

Pumping Water by Electricity. The cost and reliability. By J. M. Bryant, Prof. of Electrical Engineering, University of Illinois. 1 p., Municipal Journal, September 24. 10 cts.

Selecting Motor-Driven Centrifugal Pumps. Points to be considered in their purchase and installation. Importance of head variations; types; automatic control. By M. F. Stein. Ill., 2½ pp., Municipal Journal, September 24. 10 cts.

Turbine-Driven Centrifugal Pumps for Water Works. An analysis of the reasons why a centrifugal pump is better than a reciprocating pump. By Geo. H. Wilson. 2½ pp., Power, October 6. 5 cts.

Gauges, Pressure Recording. Use and benefit; fuel economy. By J. M. Diven. 2¼ pp., Municipal Journal, September 24. 10 cts.

Mains, "Discontinued" Water. 1½ pp., Municipal Journal, September 24. 10 cts.

Depreciation in Carrying Capacity of Pipes. Formula for cast iron mains based on studies made at Utica, N. Y. ½ p., Engineering Record, September 19. 10 cts.

Break in Springfield Supply Main. How break was repaired and pressure maintained. By Geo. L. Rinkliff. Ill., 1 p., Municipal Journal, September 24. 10 cts.

Causes of Breaks in Chicago Water Mains. Discussion of causes, analysis of forty-two breaks and suggestions for eliminating difficulty by air chambers. 1½ pp., Engineering Record, October 10. 10 cts.

Reinforced Concrete Pressure Pipe. Their use in the Baltimore water supply system. ½ p., Cement and Engineering News, September. 10 cts.

Heavy Duty Pipe Lines of Small Diameter. Methods of laying the pipe line; location. By A. D. Akin. Ill., 7 pp., Mining and Engineering World, October 3. 10 cts.

Durability of Iron and Steel Pipe. Points out the tendency to overlook the differences of composition of metals in pipes subject to test. By William Hirst. 1½ pp., Power, September 8. 5 cts.

External Corrosion of Cast Iron Pipe. Causes of corrosion; length of life; preventive methods. 1 p., Municipal Journal, September 24. 10 cts.

STREET LIGHTING AND POWER

Street Lights in Hartford. General article. Ill., ½ p., Municipal Journal, September 24. 10 cts.

Critical Studies on Street Lighting. General article on modern tendencies in street lighting with a description of the latest styles of lamp, globe and reflector. ½ p., Electrical Review. September 19. 10 cts.

Gas for Street Lighting, High Pressure. ¾ p., American Gas Light Journal, September 7. 10 cts.

Gas-Filled Tungsten Lamps in Chicago Street Lighting. General article. Ill., 2 pp., Electrical Review, September 12. 10 cts.

Electric Plant Data. Additional information concerning commercial lighting and power. 1½ pp., Municipal Journal, September 24. 10 cts.

Power Installations in Northern Georgia, Hydro-Electric. By Claude Hafer. Ill., 5 pp., Mining and Engineering World, October 3. 10 cts.

Municipalization of Hydro-Electric Power. Descriptive article. By D. A. Dugal. 1 p., Canadian Municipal Journal, October. 15 cts.

Waterside Station, Louisville Gas & Electric Co. Description of plant with special reference to condenser pit. By W. O. Rogers. Ill., 5 pp., Power, September 8. 5 cts.

Municipal Power Plants. By F. W. W. Doane, city engineer of Halifax. ¾ p., Canadian Municipal Journal, September. 15 cts.

Bakersfield, Cal., Steam Power Plant. Design, construction and operation. Ill., 6½ pp., Power, October 6. 5 cts.

Surge Tank Problems. Analysis and representation of problems due to varying outflow or to partial or complete shut-down for opening. The third of a series of articles by Prof. Franz Prasil. 6 pp., Canadian Engineer, September 3; the fourth of the series. A study of the influence of a spillway built in the surge

tank. 5 pp., September 10; the fifth of the series, covering effects of variable cross-section and with approximate formula for tanks with constant cross-section. Ill., 5½ pp., September 17. 15 cts.

Economic Design of Penstocks. Determination of best diameter of steel pipe, considering first cost, depreciation, interest and value of power lost. By M. L. Enger. 1 p., Engineering Record, September 12. 10 cts.

Transmission Lines, Steel Tower. The study on the location and construction of a power transmission line and discussion of experiments being conducted. By Albert B. Cudebec, engineer, Utah Power and Light Co. 3 pp., Canadian Engineer, September 17. 15 cts.

Peak Loads, Economy in Handling. Selection of units for best operating results under various conditions of station load. By Reginald Trautschold. 3 pp., Electrical World, September 12. 10 cts.

Tube Lighting in London, Installation of. General article. Ill., 1½ pp., Electrical Review, September 5. 10 cts.

FIRE AND POLICE.

Fire Department, Baltimore's. Force and equipment used; cost of operating motor apparatus; repair shop; school for firemen; high pressure system. Ill., 3 pp., Municipal Journal, October 8. 25 cts.

Savannah, Ga., Fire Department. ½ p., Municipal Journal, October 8. 25 cts.

Hartford Fire Department. Description of apparatus, drill school, building inspection. Ill., 3 pp., Municipal Journal, September 10. 10 cts.

Washington Fire Department. Description of fire prevention measures; building inspection. Ill., 1½ pp., Municipal Journal, September 10. 10 cts.

Norwich, Conn., Fire Department. Apparatus and force in use; cost of operating motor combination. Ill., 2 pp., Municipal Journal, October 8. 25 cts.

East Liverpool's Fire Service. Description of department; completely motorized; protection and hazards. Ill., 2 pp., Fireman's Herald, September 19. 5 cts.

Fire Apparatus in American Cities. Figures and other data from more than 700 fire departments, with amount of each kind of apparatus in service, size of force and building inspection. 25 pp., Municipal Journal, October 8. 25 cts.

Cost of Motor and Horse-Drawn Apparatus. Comparative cost of operating and maintaining fire apparatus of both kinds from figures furnished by 70 chiefs. 1½ pp., Municipal Journal, October 8. 25 cts.

Automobile Fire Apparatus. Figures on purchases made last year with list of apparatus to be purchased in the future. Ed., ¼ p., Municipal Journal, October 8. 25 cts.

Fire Prevention. State and municipal laws; building codes; fire extinguishing apparatus; danger zone. 2 pp., Municipal Journal, October 8. 25 cts.

Fire Prevention Inspection. By K. W. Detzer. ½ p., Municipal Journal, October 8. 25 cts.

Prevention in Various Cities. An outline of the work of fire prevention in many cities throughout the United States. 1 p., Municipal Journal, October 8. 25 cts.

Liability for Fires, Personal. Account of the case brought by the Bureau of Fire Prevention against an owner who failed to comply with their rules. Ed., ½ p., Engineering Record, September 12. 10 cts.

Dock Construction, How to Eliminate Fire Hazard by Changing. Concrete vs. wood for building docks. By Harrison F. Taft. 1 p., Seattle Municipal News, September 5. 5 cts.

High-Pressure Fire Service System of Boston, New. Laying of thirteen miles of special pipe fed by centrifugal pumps; pipe joints and special jointed material. Ill., 1½ pp., Engineering News, September 17. 15 cts.

Examination, Batallion Chief. Full text of the questions for promotion from captain. 2 pp., Fireman's Herald, September 12. 5 cts.

Deputy Chief Examination. Full text of the questions for promotion from batallion chief. 2 pp., Fireman's Herald, September 5. 5 cts.

Police School, Pittsburgh's New. By H. M. Phelps. 1½ pp., Municipal Engineering, October. 25 cts.

A Remarkable Trial. Pasadena fire chief with city commissioners as judges, is tried for manner of handling fire; exonerated. 1 p., Fireman's Herald, September 26. 5 cts.

GOVERNMENT AND FINANCE.

Taxation and Finance in Rural Municipalities. General article. By John Perrie, deputy minister of municipal affairs, Alberta. 1 p., Canadian Municipal Journal, October. 15 cts.

Town Planning Problems in Partially Developed Areas. By F. W. Pearse, surveyor to the Twickenham District Council. 2½ pp., Surveyor, September 4. 40 cts.

Town Planning Large Areas. By W. A. H. Clarry, borough surveyor, and R. A. Reay-Nadin, town clerk, Sutton, England. 2¼ pp., Surveyor, September 23, 40 cts.

An Example of Successful City Planning in Germany. Covering results obtained at Essen. 1½ pp., Contract Record, September 2. 10 cts.

City Assessors' Methods. A description of methods in fifty-two cities of New York State. 2½ pp., Municipal Journal, September 10. 10 cts.

Animals in Cities, Keeping. Court decisions as to validity of ordinances regulating keeping of animals within city limits. By J. Simpson. 1½ pp., Municipal Journal, September 10. 10 cts.

Rates, Controversy over Electric, in Houston, Tex. By P. H. Sheldon. 5 pp., Municipal Engineering, October. 25 cts.

Smoke as a Legal Nuisance, Soft Coal. Power of cities and legislatures to impose restrictions; what the higher courts have decided. By A. L. H. Street. 2 pp., Power, September 15. 5 cts.

STREET CLEANING AND REFUSE DISPOSAL.

Street Cleaning and Refuse Disposal in Richmond. Collection and incineration of garbage and rubbish with itemized cost of operating two incinerators. By S. T. Perkinson, Jr., chief clerk. Ill., 2½ pp., Municipal Journal, September 10. 10 cts.

Street Cleaning Methods and Results. By Edward D. Very, Sanitary Engineer, New York City. Ill., 7½ pp., Municipal Engineering, September. 25 cts.

Snow Removal by Melting with Artificial Heat, Theoretical discussion of proposed method of snow removal by streams of hot water. By S. Whinery. 1¼ pp., Engineering News, October 1. 15 cts.

Watering, Science of Street. Technical article showing the cost of sprinkling and describing suitable sprinklers. By E. H. Essex, surveyor, Layton Council. 1½ pp., Surveyor, September 11. 40 cts.

Dust Removal the Only Prevention. Summary of methods for reducing the dust nuisance on streets. By C. D. Pollock. ½ p., Municipal Journal, September 10. 10 cts.

Refuse Destruction—The Evolution of Efficient and Economical Methods of Disposal. With an account of the various methods; latest practice; costs of various methods; experiences in different cities. By R. O. Wynne-Roberts. 5 pp., Contract Record, September 15. 10 cts. 4½ pp., Canadian Engineer, September 24. 15 cts.

Refuse Destructor Plant Which Operates a Pumping Station. Description of the plant at Savannah, Ga. Ill., 2 pp., American City, September, 25 cts.

Refuse Destructor. At Clifton, N. Y. A brief description of the plant, the work done, and the cost. Ill., 2½ pp., Municipal Engineering, September. 25 cts.

Memphis Refuse Disposal. Working of three garbage incinerators with expenditures for 1913. By Gino Pierotti, Supt. Street Cleaning. ½ p., Municipal Journal, September 10. 10 cts.

Collection and Disposal of City Refuse, Washington, D. C. The fourth of a series of articles on Washington street cleaning methods, giving practices in detail where collection and disposal are done by contract. By J. W. Paxton, Supt. Street Cleaning. Ill., 3½ pp., Engineering News, October 1. 15 cts.

TRAFFIC AND TRANSPORTATION.

Traffic Rules for St. Louis, New. Special regulations; method of parking automobiles in business district. By H. M. Crutcher. Ill., 1½ pp., Municipal Journal, Oct. 1. 10 cts.

Traffic Investigation, Denver. Account of persons entering and leaving business district during eighteen-hour period with conclusions as to the effect of automobiles on street car receipts. By R. W. Toll. Ill., 8 pp., Aera, October. 25 cts.

Cost-Keeping Forms, Motor Truck Makers Endorse. System for showing comparative costs of horse and motor vehicles. 2 pp., Commercial Vehicle, September 15. 20 cts.

Efficiency of Department Store Trucks, Conditions of Service Determine. The third of a series of articles on the use of the motor vehicle in Pittsburgh department stores. Ill., 5½ pp., Commercial Vehicle, September 15. 20 cts.

Conditions which Govern the Type of Car for City Service. Ill., 9 pp., Brill Magazine, September. 5 cts.

MISCELLANEOUS.

Bridge, Concrete Arch, with Ornamental Tile Panels, Philadelphia. By Jonathan Jones, asst. engr. Ill., 2 pp., Engineering News, September 17. 15 cts.

Building the Pitt River Bridge. General article. 2 pp., Ill., Contract Record, September 30. 10 cts.

Electrical Inspection, Municipal. Description of the methods employed in various cities with tabulation of work in cities having population over 100,000. 1½ pp., Electrical Review, September 19. 10 cts.

Data on Electrical Inspection. Ed., ½ p., Electrical Review, September 19. 10 cts.

Building Inspection in Minneapolis. New system worked out by Chief Ringler; use of index cards. 1 p. Municipal Journal, October 8. 10 cts.

Wires Go Underground, All Baltimore's Ill., 2 pp., Manufacturers Record. September 3. 30 cts.

Sand and Gravel. Giving the total production of the sand and gravel for the past ten years, their value and the value of the imports. By R. W. Stone. 1½ pp., Cement and Engineering News, September. 10 cts.

Digging Gravel with Dragline Excavator. Ill., 1 p., The Contractor, October 1. 20 cts.

Concrete, Permeability Tests on Gravel. Proportions, time of mixing, sequence of placing materials in mixer and curing are factors. ½ p., Engineering Record, September 26. 10 cts.

Field Tests of Concrete for Municipal Work at Kansas City, Mo. By E. S. Wallace, city engineering dept. Ill., 2½ pp., Engineering News, September 10. 15 cts.

Clay and Shale Deposits of the Western Provinces. Location of deposits suitable for brick and cement making. 2½ pp., Contract Record, September 9. 10 cts.

Tar from Coal Gas, Electrical Separation of. Description of the methods used, equipment needed and results obtained. By A. H. White, R. B. Rowley and C. K. Wirth, University of Michigan. Ill., 3½ pp., American Gas Light Journal, September 21. 10 cts.

Electrical Separation of Tar from Gas. Technical article. Ill., 4 pp., Gas Age, September 15. 20 cts.

Iron and Steel, Resistance to Corrosion of. Results of tests covering a period of three years, by a committee of Railway Engineering Association. 2 pp., American Gas Light Journal, September 7. 10 cts.

Harbor Development, Progress of Toronto's $25,000,000. Ill., 4¾ pp., Contract Record, September 30. 10 cts.

Smoke Problem, Engineering Phases of the Pittsburgh. Articles showing that, outside of the topography favorable to the smoke nuisance, Pittsburgh's difficulty is due chiefly to carelessness in the operation of furnaces. 2 pp., Power, September 8. 5 cts.

Hydraulic Excavation in Westover Terrace Project in Portland. Sluicing 3,000,000 yards of material from a steep hillside in order to construct a terraced residential district and convert an existing lake into an industrial section. By R. M. Overstreet. Ill., 5½ pp., Engineering Record, September 12. 10 cts.

Exhaust Steam from Engines Utilized in Low-Pressure Turbines. By C. A. Tupper. Ill., 5 pp., Mining and Engineering World, September 5. 10 cts.

Transmitting Power by Compressor Air. Efficiency of transmitting power to air pipes, determining the flow of air and the friction during transmission. By L. L. Brewster. 2½ pp., Power, September 8. 5 cts.

Municipal Abattoir at Grand Forks. By H. G. Lykken, City Engineer. 1 p., Municipal Journal, September 10. 10 cts.

Stone Plants, Electricity in. Ill., 2 pp., Stone, September. 15 cts.

Municipal Engineering, Recent Developments in the Field of. By F. W. W. Doane, city engineer, Halifax. 2½ pp., Contract Record, September 15. 10 cts.

Applied Geology in Municipal Engineering. By Herbert Lapworth, M. I. C. E. 3½ pp., Contract Record, September 2. 10 cts.

Retaining Wall, Concrete Steps and Park construction work in St. Louis. 1 p., Engineering News, October 1. 15 cts.

NEWS OF THE SOCIETIES

Calendar of Meetings.

Oct. 7-17.
ELECTRICAL EXPOSITION AND MOTOR SHOW.—Grand Central Palace, New York City. George . F. Parker, Vice-President and General Manager, 124 West 42d street, New York City.

Oct. 12-16.
AMERICAN ELECTRIC RAILWAY ASSOCIATION.—Convention, Atlantic City, N. J. E. B. Burritt, 29 West 39th street, New York City.

Oct. 12-16.
LEAGUE OF CALIFORNIA MUNICIPALITIES.—Seventeenth Annual Convention. Hotel Del Monte Monterey, Cal.

Oct. 14, 15.
ILLINOIS MUNICIPAL LEAGUE.—Annual Convention, Urbana-Champaign.

Oct. 20-23.
INTERNATIONAL ASSOCIATION OF FIRE ENGINEERS.—Annual Convention, Grunewald Hotel, New Orleans, La. Secretary, Mr. McFall, Roanoke, Va.

Oct. 21-23.
ALABAMA GOOD ROADS ASSOCIATION.—Nineteenth Annual Convention, Montgomery, Ala. Secretary, J. A. Rountree, 1021 Brown Marx Bldg., Birmingham, Ala.

OCT. 21-23.
PENNSYLVANIA WATER WORKS ASSOCIATION.—Annual Convention, Haddon Hall, Atlantic City, N. J.

Oct. 28-31.
NORTHWESTERN ROAD CONGRESS.—Annual Convention, Milwaukee, Wis. Secretary, J. P. Keenan, Milwaukee.

Nov. 9-10.
VIRGINIA LEAGUE OF MUNICIPALITIES.—Annual Convention, Norfolk, Va. Col W. H. Sargeant, Jr., President.

Nov. 9-13.
FOURTH AMERICAN ROAD CONGRESS.—American Highway Assoc. and American Automobile Assoc., Atlanta, Ga. Secretary, J. S. Pennybacker, Colorado Building, Washington, D. C.

NOV. 12-14.
NATIONAL CONVENTION OF MAYORS OF AMERICAN CITIES.—Philadelphia, Pa.

Nov. 16 and 17.
MONTANA MUNICIPALITIES.—Third Annual Meeting held at Billings, Mont. Robert Leavens, Mayor of Billings.

Nov. 17-21.
NATIONAL MUNICIPAL LEAGUE.—Annual Convention, Baltimore, Md. Secretary, Clinton Rogers Woodruff, North American Building, Philadelphia, Pa.

Nov. 18-20.
WASHINGTON STATE GOOD ROADS ASSOCIATION.—Spokane, Wash. Secretary, M. D. Lechey, Alaska Building, Seattle, Wash.

NOV. 23-28.
EXHIBITION OF STREET CLEANING APPLIANCES.—Department of Street Cleaning, City of New York. J. T. Fetherston, Commissioner of Street Cleaning.

Nov. 30-Dec. 6.
AMERICAN PUBLIC HEALTH ASSOCIATION.—Forty-second Annual Convention, Jacksonville, Fla. Dr. C. E. Terry, Chm., Executive Committee.

Dec. 2, 3, 4.
CITY MANAGERS' CONVENTION.—Springfield, Ohio. C. E. Ashburner, City Mgr., Springfield.

Dec. 14-17.
AMERICAN ROAD BUILDERS' ASSOCIATION.—11th Annual Convention; 5th Annual Good Roads Congress, and 6th Annual Exhibition of Machinery and Materials, International Amphitheatre, Chicago, Ill. Secretary, E. L. Powers, 150 Nassau st., New York, N. Y.

Feb. 10-17, 1915.
EIGHTH CHICAGO CEMENT SHOW.—Coliseum, Chicago, Ill. Cement Products Exhibition Co., J. P. Beck, General Manager, 208 S. La Salle Street, Chicago, Ill.

THE AMERICAN SOCIETY OF MUNICIPAL IMPROVEMENTS.

The twenty-first convention of the society was held in Boston at the Hotel Somerset during the larger part of last week. On Monday, October 5, at 11 o'clock, the committee on Standard Specifications began its series of meetings of both the general committee and the sub-committees, which were continued throughout a large part of the first four days of the week, several meetings lasting long after midnight. The convention proper, however, did not begin until Tuesday at about 10.45, when addresses of welcome to the society were delivered by Mayor James M. Curley and Col. William D. Sohier, chairman of the Massachusetts Highway Commisssion, which were responded to by Norman S. Sprague, third vice-president of the society and superintendent of the Bureau of Construction of Pittsburgh, Pa. This was followed by the president's address, reports of the secretary and treasurer, the executive committee, finance committtee, and the committees on membership and on sidewalks. The address of Mayor Curley was unusually informative concerning what Boston has been, is and proposes doing; among the last named being the construction of twenty-five miles of concrete sidewalk each year for the next four years, motorizing the fire department and constructing a high-pressure water system for fire fighting. Col. Sohier stated his belief that the high efficiency of road work in Massachusetts was obtained by keeping employees who had been trained in the service, instead of discharging them with every change of administration as some states near to New England were doing.

The chairman of the committee on sidewalks, Andrew Lenderink, city engineer of Kalamazoo, Mich., discussed briefly the subject of the municipal control to be exercised over sidewalk construction and maintenance, and gave a proposed form of municipal ordinance covering the same. In discussing this, C. C. Brown stated that all Indianapolis cities treat their sidewalks in the same way as roadway pavements as to control of construction and maintenance. One member objected to permitting rain water to be carried across the sidewalks, either on their surface or immediately below them, claiming that all leaders should be connected to the sewers; but recognized that where there were no storm water or combined sewers this would be impracticable. Following this, a nominating committee was adopted and the meeting adjourned until 2 p. m.

The afternoon session opened with a paper entitled "Cost of Collecting, Hauling, Transferring and Transporting Refuse Materials," by S. A. Greeley, which was read by the secretary. This contained figures and calculations as to these costs. There was no discussion. A paper on "Street Cleaning" was read by the author, Edward D. Very, which was followed by one entitled "The High Temperature Incinerating Plant at Savannah, Ga.," read by the author, E. R. Conant, city engineer of Savannah. In this paper Mr. Conant stated that all of the heat from the incinerator is being used by the pumping station, the boiler plant of which is only 140 feet from the incinerator. The incinerator has a capacity of 130 tons in twenty-four hours. The guarantee was that 1.3 pounds of water would be evaporated for each pound of refuse burned and that the boiler would develop 330 horse-power net, exclusive of power required by the plant itself; also that the cost of incineration would not exceed 40.4 cents per ton consumed. During one test the actual evaporation was 1.62 pounds of water. It is calculated that $500 a month is saved in fuel at the waterworks plant, although the incinerator is consuming but 80 tons a day, about 20 tons of which were from melon rinds during July and August. The city pays the stokers at the plant $1.75 a day and the engineer $4. At the present time no use is being made of the clinker. The cost of the plant was $126,271. Owing to certain conditions, which Mr. Conant stated in no wise deflected upon the plant itself, the final acceptance has been deferred until quite recently, but the final payment has been made upon the plant within the last few days. The paper on "Municipal Ownership and Operation of Electric Utilities on the Pacific Coast," by C. W. Koiner, which had been printed in the advance papers, was read by title.

In the evening, under the title "Sewage Disposal, Preliminary Investigations Required," E. A. Fisher, consulting engineer to the city of Rochester, N. Y., gave the history of the plans for treating Rochester's sewage which are now being carried out. This was followed by a paper entitled "Municipal Cleanliness," by I. S. Osborn, consulting engineer in charge of installing complete methods of refuse collecting and disposal for Toronto. This paper was illustrated by lantern slides, and was a general discussion of the subject of street cleaning and refuse collection. George T. Hammond described the experimental sewage disposal plant of Brooklyn, N. Y., of which he was the engineer in charge of design and operation. This plant was described in the Municipal Journal a few weeks ago. This paper was illustrated with photographs of the plant. N. S. Sprague, superintendent of the Bureau of Construction of Pittsburgh, referring to the explosions which that city has experienced in its sewers due, it is supposed, to inflammable gases, discussed the theory of such explosions and the methods of avoiding them, giving the information obtained on this subject by correspondence with a considerable number of cities. The session closed with a paper by George C. Whipple entitled "Permanent Sediment Records for Water and Sewage," in which Professor Whipple described briefly and illustrated by samples a method of collecting and filing sediment from different localities by the use of raw cotton.

The session on Wednesday morning was brief, consisting of the report of the committee on Fire Prevention, by Alcide Chausse, city architect and

superintendent of buildings of Montreal; a paper on "Fire Prevention," by J. C. McCabe, boiler inspector of Detroit, and an address by Franklin H. Wentworth, secretary of the National Fire Protection Association of Boston. Following these the report of the committee on Traffic on Streets, by Louis L. Tribus, chairman, was read by the secretary, and Clarence D. Pollock, consulting engineer of New York, read a paper entitled "Small Parks for Southern Cities." In discussing the latter Mr. Pollock stated that in southern cities where the soil was of a clayish nature, Bermuda grass was perhaps the best for sod. In sandy soil there may be difficulty in maintaining a good sod. The ever-disputed question as to whether or not grass or parking should be placed between the curb and the sidewalk was briefly discussed.

At noon the members and guests, at the invitation of the city, rode by trolley to the municipal wharf where they boarded the city steamer "Monitor" for a trip around the harbor. Shortly after starting three fire-boats of the Boston fire department passed the "Monitor" twice, meantime playing streams from four to six of their nozzles. The steamer passed the city garbage and reduction plant on Spectacle Island and the two outlets of the Metropolitan sewerage system, the Fore River Shipbuilding Company's works and other points of interest. A luncheon was served by the city in the meantime.

In the evening the election of officers was held, which resulted as follows: For president, William A. Howell, engineer of streets and highways of Newark, N. J.; first vice-president, A. F. Macallum, city engineer of Hamilton, Ont.; second vice-president, Norman S. Sprague, superintendent bureau of construction of Pittsburgh, Pa.; third vice-president, E. L. Dalton, of Dallas, Texas; secretary, Charles C. Brown, of Indianapolis, Ind.; treasurer, Will B. Howe, city engineer, Concord, N. H.; finance committee, F. J. Cellarius, of Dayton, Ohio; L. V. Christy, secretary of street and sewer department, Wilmington, Del., and R. K. Compton, of Baltimore, Md.

Invitations were received to hold the next meeting of the society in New Orleans, Buffalo, Dayton, San Francisco and several other cities, only the first three being presented in person on the floor, however. Balloting was by roll call and resulted in 39 votes for Dayton, 19 for New Orleans and 5 for Buffalo; the representatives of the two latter cities making and seconding a resolution to make the vote unanimous for Dayton, which was carried. Newark presented an invitation to the society for the year 1916.

A paper describing "Converting an Old Septic Tank Into a Model Two-Story Tank" was read by Alexander Potter, who illustrated it with lantern slides, showing the plans of the modified tank. A machine for testing brick and other clay materials by a sort of sand blast created by centrifugal force was described by Mont. Schuyler, and a full-size machine was set up in the hall for examination by the members. This was followed by a paper entitled "Concrete Highways," by George W. Myers. George A. Parker, superintendent of parks of Hartford and chairman of the committee on Park Development and Maintenance read the report of that committee in which he emphasized the importance of parks in preserving the health and decreasing the poverty of a large part of the population of the larger cities. A brief statement by Walter F. Slade, commissioner of public works of Providence, R. I., describing the practice of that city in using no water for cleaning a large percentage of its pavements was then read and was discussed by George C. Warren, who strongly endorsed the idea.

Thursday morning the report of the committee on Standard Forms was presented by J. C. Hallock, who also presented the reports of the sub-committees on Street Paving and Repairs, Street Cleaning and Refuse Disposal, Street Lighting, Sidewalks and Curbs, Sewer Construction and Maintenance, and Uniform Bidding Blanks. J. T. Fetherston, commissioner of street cleaning of New York City, presented a standard form for street cleaning and refuse collection and disposal which he recommended for temporary use in collecting statistics, believing that very few cities were ready as yet to furnish information on any more elaborate scale. E. S. Rankin, engineer of sewers and drainage of Newark, presented four forms for recording data concerning sewer construction and maintenance. He stated that these had been submitted to the Bureau of the Census, and the director of that bureau and his committee had agreed upon two of these forms. He recommended these two for adoption at this time and that the other two be published in the Proceedings and considered at the next convention, which was done. In the evening Harrison P. Eddy, member of a committee of the Boston Society of Civil Engineers, which had prepared similar forms, was present and explained the status of those forms and expressed the hope that the forms adopted by this society would be in practical accord with those of the Boston Society and of the Census Bureau. Chairman Hallock, of the committee, called attention to the system of printing city specifications on loose-leaf pages which could be carried by the inspectors in their pockets; the advantage being that each inspector could then carry only those specifications with which he was concerned, and changes in the specifications from time to time could be made without the expense of republishing the entire form, but only the page or pages on which they occurred. C. C. Brown stated that he had used these for a number of years and highly recommended them.

A paper by George W. Fuller entitled "Economics of Sewage Filters" was read by vice-president Howell. The report of the committee on Standard Specifications, George W. Tillson, chairman, was then presented. For the greater part, these reports consisted in combining the specifications previously adopted by this organization and the Association for Standardizing Paving Specifications, which specifications had been in practical accord on most points. Such revised specifications were adopted for brick pavements, concrete streets and sidewalks, asphalt and stone block. The committee on wood block paving was not able to agree upon a report, and was continued until the next year; with the understanding, we believe, that the existing specifications continue as the specifications of the society until that time. The committee on bituminous pavements also was unable to submit a final report, but hopes to do so next year. The specifications for sewers as published in the last Proceedings were adopted with very few changes; except that alternative paragraphs were offered for concrete sewers, with the idea that engineers could take their choice of these and that possibly an agreement by the society could be made upon one or the other of them a year from now.

Among the new provisions in the specifications were the following:

Stone block: That the minimum crushing strength of granite be made 20,000 pounds. That the depth of the block vary from 4¾ to 5¼ inches. That the cushion average one inch in thickness. That the toughness requirement be changed from 11 to 9.

Brick specifications: That the loss do not exceed 22, and do not vary more than eight points in brick from one plant on any one improvement, this applying to the average of each ten brick of each class. That the cushion may be of material other than sand if free from foreign matter and containing not to exceed 10 per cent of loam, graded from ¼ inch to 50 mesh screens; screenings which meet the specifications for the sand being acceptable. Rolling the pavement, as now specified, shall be continued until the pavement "has a smooth surface." Grouting sand in size should be between 20 and 100 mesh sieve. For grouting, enough sand and cement shall be mixed dry for one-half day at a time. The first filling of the grout should be brought to within not more than ½ inch of the top.

Under concrete pavements a limit of size of stone of 2½ inches was adopted.

The asphalt specifications were based on those of the A. S. M. I., most of the changes being corrections of typographical errors, elision of duplications and other improvements in expression. The committee submitted as an appendix to the specifications recommendations of methods for taking samples and testing, together with a brief discussion of the interpretation of tests, these being for the benefit of those not experienced in these matters.

A set of specifications for broken stone roads, both with and without bituminous cover, was submitted by

Professor A. H. Blanchard and adopted without discussion.

On Thursday afternoon the members were given an automobile ride to various points of interest in Boston, Brookline, Cambridge, Arlington and Lexington; incidentally passing over many miles of pavements of various kinds, the nature and age of which were indicated on a route card.

On Thursday evening the meeting opened with a Query session and the presentation by Secretary Brown of information obtained by the society's Clearing House concerning several matters. The latter topics included data concerning the economical maximum grades of pavements, explosions in sewers, practice and experience as to creosoted block pavement and as to laying bricks flat in road pavements. The data collected under these heads will be published in the Proceedings, as will also tabulated data concerning garbage incinerators obtained in the same way. C. H. Teesdale, in charge of wood preservation at the Forest Products Laboratory, Madison, Wis., read a paper on the bleeding and swelling of long leaf pine paving blocks, in which he advocated steaming the blocks before and after treating with creosote. In discussing this, Henry S. Loud, chief engineer to the U. S. Wood Preserving Company, said that steaming was necessary to secure uniformity of absorption where blocks contained both heart and sap wood and was now quite common practice. One of the reasons for steaming is that any air in the pores expands under heat much more than would moisture, and thus forces out the sap from the pores and causes bleeding to a much greater extent than if water had been forced to take the place of the air. A. W. Dow stated that his experience was that even when steamed, blocks when laid will bleed when expansion due to heat places them under pressure of the adjacent blocks in the pavement.

A paper on vitrified brick street construction was read by Will P. Blair, secretary of the National Paving Brick Manufacturers' Association, which was illustrated by a few lantern slides. George C. Warren read a paper on "The Effect of Leaking Illuminating Gas on Bituminous Pavements," which was accompanied by a demonstration of this effect by means of certain apparatus by which Mr. Warren showed that illuminating gas contributed a part of its constituents to bituminous materials with which it was brought in contact and that it softened such materials. The description of the laying of napped, reclipped grouted granite blocks was then presented in Newark, together with a history of such use of old granite blocks was then presented by William A. Howell, engineer of streets and highways of Newark, followed by the reading by title of a similar paper by S. C. Thompson, engineer of highways of Bronx Borough, New York; the latter paper not being read in full as the author stated that he had to a large extent and unknowingly duplicated Mr. Howell's paper.

The chairman of the committee on bituminous pavements explained that its object was to present two sets of specifications, one covering bitulithic and the other an acceptable bituminous concrete which would be admitted by the owners of the patented pavement to be non-infringing; but that it could not do so before the convention adjourned. The committee was requested to publish within three months two sets of specifications coming under these heads, these to be considered and acted upon at the next convention.

It was decided by the convention to print the society's specifications as adopted as soon as possible, so that they could be used at once, 1,000 copies to be printed in book form and distributed free to members and sold to non-members at $2 per copy. Separate specifications for each class of pavement to be printed in pamphlet form also and sold at 25 cents a copy.

On Friday, Nelson P. Lewis, chief engineer of the Board of Estimate and Apportionment of New York City, presented the reports of the committee on municipal legislation and finance; also a paper by himself entitled "Recent Tendencies in Charter Legislation." A paper by William Thum of Pasadena, entitled "Hints Leading to Good Budget Making for Municipalities" was read by title, as was also a paper entitled "Municipal Financing" by A. F. Macallum, the author of the latter stating that his paper consisted largely of forms to be used in making municipal financial reports. The concluding paper was by George W. Fuller entitled "The Limitations of Water Filters," in which the author called attention to the fact that a limit should be placed to the pollution of the water which water filters are expected to make satisfactory for drinking purposes. In discussing this, C. A. Findley stated that experiences of smaller cities along the Great Lakes seem to indicate that where a water supply is polluted through neglect in operation of the filter plant for only two or three hours a day, the result in typhoid death rates appears to be as great as if the contamination were continuous. At this final session a committee of three was appointed to study the general subject of committee work for the society, define the duties of each committee and so correlate these that the entire field proper to the society would be satisfactorily covered by the standing committees.

The attendance at the convention was two greater than at Wilmington the previous year, which up to that time had been the largest of any convention. The total attendance was about 295, of which 100 were active members and 66 were associate members. The total active membership of the society is now about 390 and the associate membership about 90.

The rear of the convention hall and an adjoining room of considerable size were devoted to exhibits of municipal appliances as follows:

Walter C. Parmley, of New York, Photographs and literature describing system of sewer construction.

Frank Ridlon Company, Boston; snow removers and Eureka street ice cutters. Photographs and literature.

U. S. Wood Preserving Company, New York City. Blocks treated and untreated.

Dunn Wire-Cut-Lug Brick Company, Conneaut, Ohio. Literature.

Good Roads Machinery Company, Boston. Photographs and literature.

Dyar Supply Company, Cambridge, Mass.; agent for road machinery. Model of rubbish can.

Wern Stone Paving Company of New York; Durax paving blocks. Literature.

Bausch & Lomb Optical Company of Rochester, N. Y.; levels, transits, etc., a number of which were exhibited.

Universal Road Machinery Company of Kingston, N. Y. Photographs and literature.

"Better Roads and Streets" of Dayton, Ohio. Copies of publication.

Engineering News of New York City. Copies of publication.

Municipal Journal of New York City. Copies of publication.

Good Roads of New York City. Copies of publication.

Engineering Record of New York City. Copies of publication.

Headley Good Roads Company of Philadelphia; Bi-Co-Mac. Samples displayed.

Sanitation Corporation of New York City. Model of Riensch-Wurl screen.

Barrett Manufacturing Company of New York City. Samples of asphalt, frame of illuminated photographs on glass, and literature.

U. S. Asphalt Refining Company, New York City. Photographs of road work using Astec asphalt.

American Sewer Pipe Company of Akron, Ohio. Full size sample of Amco segment sewer.

National Paving Brick Manufacturers' Association, Cleveland, Ohio. Literature.

Warner-Quinlan Asphalt Company of New York; Montezuma asphalt. Samples and literature.

Robeson Process Company, Pennington, N. J.; Grutrin. Literature and large photographs.

C. L. Berger & Sons of Boston; levels, transits, etc.

Jennison-Wright Company of Toledo, Ohio; Kreolite lug and Hex blocks. Samples, models and literature.

Barber Asphalt Paving Company, New York City. A pavement sample thirty-five years old, literature and photographs.

Buffalo Steam Roller Company, Buffalo, N. Y. Photographs and literature.

Union Oil Company, San Francisco, Cal.; Union asphalt. Samples, photographs and literature.

(Continued on page 576)

NEW APPLIANCES

A CONDUIT MAINTENANCE TRUCK.

Equipped with Pumps, Lighting Plant, Repair Equipment and Wireless Equipment.

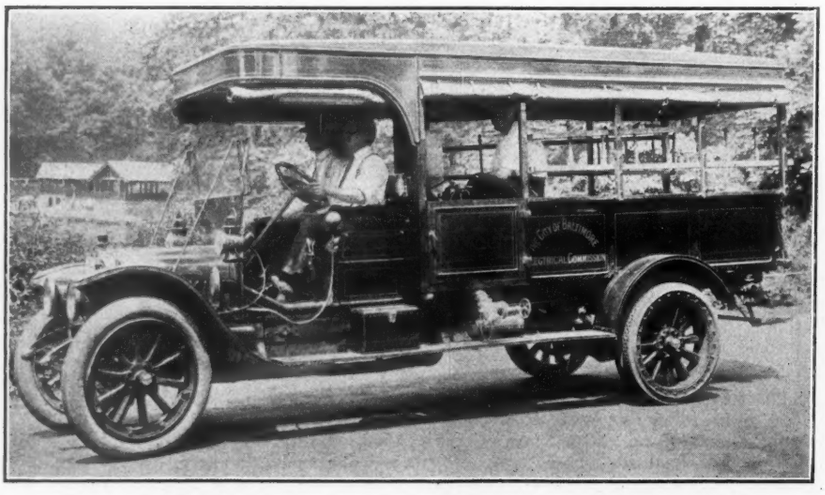
The Electrical Commission of the city of Baltimore, Md., has placed in service an unusual type of motor truck which performs an astonishing number of duties in the maintenance of the municipal conduit system. This motor truck, which was built by the White Company, of Cleveland, O., combines a vehicle for transporting repair crews and supplies, and embodies a pumping station, a lighting plant, a repair shop and a wireless equipment, enabling the commission to keep in constant touch with the truck. Perhaps the most striking feature of this machine is the fact that the wireless equipment, unlike any other portable set, enables the crew to receive messages while the truck is being driven along the streets. The appearance of the machine gives no suggestion of its great utility in conduit maintenance, but when ready for action it is capable of pumping 12,000 gallons of water per hour from a flooded conduit, and it will furnish a flood of light for inspection and repairs, besides carrying all the necessary paraphernalia. The body was constructed in conformity with plans devised by the Electrical Commission for the best accommodation of the different pieces of apparatus and it possesses several noteworthy features. Hinged entrance doors, one on each side, greatly facilitate the operation of the equipment, while hinged double doors in the rear provide a ready access to various enclosed compartments used as repositories for suction hose and other paraphernalia. The overhanging hood also forms a locker compartment which is used for the storage of boots and waterproof clothing.

Just in the rear of the driver's seat is mounted a gasoline-driven centrifugal pump which is capable of exhausting water from manholes at the rate of 12,000 gallons per hour. For the sake of economy the pump is not driven by the 30-horsepower truck engine, but is directly connected to an independent 4-horsepower gasoline marine engine. The pumping engine, however, is cooled from the same source as the larger engine, that is, water is pumped from the bottom of the truck radiator through flexible metal hose to the marine engine and returned to the top of the radiator after circulating around the cylinders of the truck engine. By this method of cooling the cylinders of the marine engine are always kept warm, which, of course, greatly facilitates starting, especially in cold weather.

The suction of the pump is connected through a priming device to three 3-inch brass gate-valves by means of an iron pipe line suspended under the body. These valves are located one on each side of the body below the side doors, and one in the rear, so that a hose connection can be obtained regardless of the location of the manhole without violating any of the traffic regulations. The valves are set at an angle of 45 degrees with the street bed in order to avoid unnecessary bends in the suction hose. The discharge side of the pump is connected to a 3-inch flexible metal pipe which can be turned through an angle of 180 degrees for the purpose of exhausting the water in the most advantageous direction. When not in use this pipe is hooked to the under side of the running board. The pumping engine also operates a small dynamo which, in addition to furnishing ignition for the marine engine, supplies sufficient current for illuminating manholes. By the aid of the portable lamps which can be plugged in on the dynamo current, duct chambers may be examined for a distance of 50 feet to determine the nature and cause of obstructions in the conduits.

The most unusual and interesting feature of the outfit, however, is the wireless equipment, through the agency of which the department keeps in constant communication with its trouble crew, so that all emergency calls can be handled with the greatest dispatch before serious damage can ensue. The truck serves as a receiving station only. The antenna is suspended immediately under the roof of the car and was made of approximately 425 feet of No. 14 stranded, rubber-insulated, copper wire, which was laced back and forth until 40 wires were obtained with a separation of one inch. The aerial is therefore inconspicuous and well protected. A series of rigid tests proved conclusively that the equipment is entirely practical and that excellent results can be obtained through the aid of a simple code of signals without resorting to the employment of trained wireless operators. It was also demonstrated that direct earth connection was unnecessary, inasmuch as the iron framework of the chassis serves admirably as a counterpoise ground, thereby enabling the truck to receive while in motion. During all the preliminary tests, the truck never failed to intercept any message

"DAYTON" ORNAMENTAL WASTE BOX.



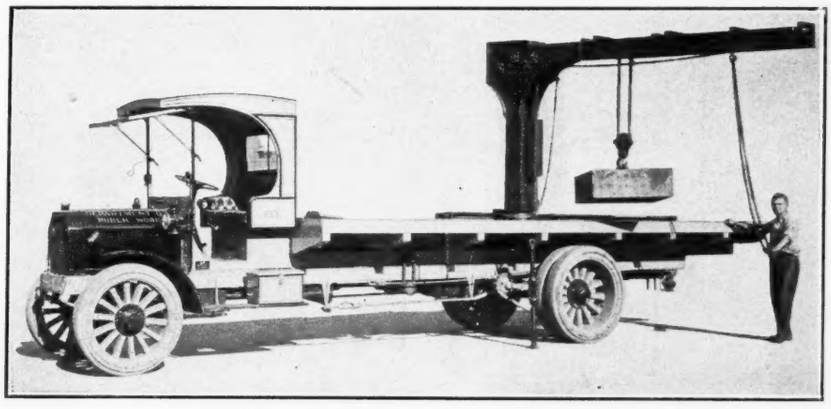
WHITE CONDUIT MAINTENANCE TRUCK.

sent to it within a radius of ten miles of the sending station and even under the most unfavorable conditions, with the truck running at full speed and blanketed by tall buildings of steel construction, no difficulty was experienced in reading the messages.

A NOVEL GARBAGE TRUCK.

Peerless Truck Carrying 2½-Ton Crane.

An extremely difficult traffic problem in the garbage department of the city of Detroit has recently been met by the use of a special Peerless six-ton truck equipped with probably the largest crane that ever has been installed upon a motor truck. This crane will lift two and one-half tons onto the truck. Most crane experts have heretofore contended that a one-ton crane was



PEERLESS GARBAGE TRUCK WITH CRANE.

the largest that any truck could carry. The garbage of the city of Detroit is carried on open coal cars to the plants of the Detroit Reduction company outside of the city. There are only a few substations at which the cars can be loaded, for property owners in the vicinity object very strenuously to them and in many cases have forced the abandonment of newly opened stations. This makes a long haul to the substation unavoidable. It was found impracticable to use motor trucks for the actual collection of garbage because of the great frequency of the stops made it require as long a time to load a ton of garbage upon the truck as upon a wagon. Yet when horse wagons were used exclusively the long haul with the empty or fully loaded wagon would often take from two to three hours. The wagons in many cases were able to make only one trip a day.

Mr. Jack Knight, Superintendent of the Garbage and Street Cleaning Department, solved this problem by the purchase of the special Peerless six-ton truck. Garbage wagons from the different sections of the city are met on the way to the substation and their two-ton loads are lifted off onto the truck by the crane. An empty box is hoisted from the truck to the wagon to be refilled. One wagon now collects two loads in the time that was formerly required to collect one. In the case of the break-down of a garbage wagon on the streets the truck picks up the load and removes it at once, avoiding the very undesirable condition created when it has to be shoveled from one wagon to another. The truck was made by the Peerless Motor Car Co., Cleveland, O.

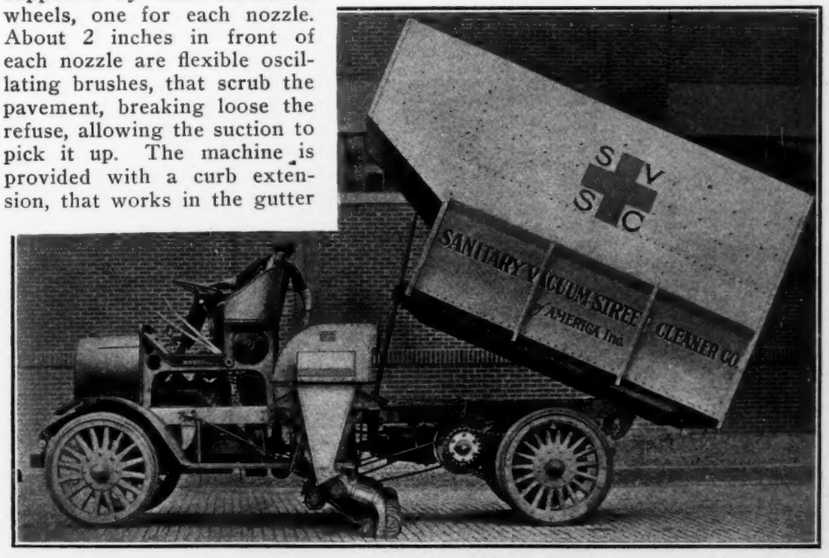
A SANITARY VACUUM STREET CLEANER.

A Large Capacity Auto Pick-Up Sweeper.

A vacuum street-cleaning machine has just been manufactured which in principal seems to be the same as the vacuum carpet cleaner. It is designed to clean a strip of pavement about 15 ft. wide at a speed of 2 to 10 miles per hour. It is estimated that the refuse receptacle will hold the sweepings from 25 miles of pavement. The cleaner is self-contained, built on a motor-driven truck, the one engine being of sufficient horse-power to furnish power for the truck and other parts of the machine at the same time, both of which are operated by one man. The suction is produced by a pair of special exhausters, furnished by the American Blower Co., which have the intake connected to the upper end of the wind-chest, which is so constructed as to equalize the suction along the entire base or cleaning strip. The base is equipped with a number of flexible suction nozzles, about 5½ inches wide, supported by small individual wheels, one for each nozzle. About 2 inches in front of each nozzle are flexible oscillating brushes, that scrub the pavement, breaking loose the refuse, allowing the suction to pick it up. The machine is provided with a curb extension, that works in the gutter against the curbing, and carries a brush that scrubs the surface being cleaned.

The brushes are so arranged that the operator of the machine may place any amount of pressure on the brushes, giving them a scrubbing pressure of 2 to 10 lbs. per brush. With the combination of the telescopic curb extension and the oscillating brush system, that loosens and breaks up all street refuse, even the particles that are stuck, and the yieldable suction base which conforms itself to the unevenness of the pavement, enabling the machine to clean all classes of pavement and in any state of repair. When the machine is cleaning an oiled street the brush system is raised off the surface being cleaned and thrown out of gear, and the suction is then regulated according to the surface being cleaned. The refuse is picked up by the suction through the suction nozzles and delivered to the refuse receptacle through the wind-chest. The refuse receptacle containing an open space between the refuse bin and dust settlers, which is used as an air expansion chamber. In this chamber are deflecting plates to distribute the wind pressure and break up the air currents. The air passes out through the dust settlers at a speed of about one mile per hour. A dump mechanism actuates the body for dumping the refuse, and there are also extra bins, side dumping bins and bins with the traveling bottoms.

Each part of the machine is entirely independent of the others; the air nozzles can be raised or lowered without disturbing other parts of the machine. The brushes can be thrown in and out of operation, left to drag or they can be raised to an inoperative position, with the same lever. Thrown the other way the operator can place any desired pressure on the brushes. The truck can be driven at any speed independent of the street-cleaning part of the machine. The vacuum or suction part of the machine can be regulated according to the kind of condition of repair of the pavement and the speed of travel of the machine. Although complete in its function it is



SANITARY VACUUM STREET CLEANER.

claimed that the machine is simple in construction and operation. The only additional revolving parts, besides those in the truck, being the shaft that gives the brushes their oscillating movement in front of the air nozzles and the exhausters, for pumping the air. The variable speeds of the exhausters is obtained through a friction disc. The only additional levers are one foot pedal, three levers and a rod to operate the hoist for the dump. All operation is done from the driver's seat by means of levers; one set operating and controlling the pneumatic machinery, the other set the motor truck. Through the levers controlling the suction machine, the brush system may be set in or out of motion. One lever raises or lowers and places them under spring tension; another raises or lowers the air nozzles; another set operates the variable speed transmission to the exhausters in the windchest, enabling the operator to produce the variable suction.

It is claimed that with this machine the pavement is thoroughly swept—no dirt being left in crevices or in the gutter as in broom sweeping, and no pools of mud remaining as in flushing.

The Sanitary Vacuum Street Cleaner is not made for sale but for leasing to municipalities by the manufacturers, the Sanitary Vacuum Street Cleaner Co. of America, Inc., Plymouth Bldg., Minneapolis, Minn.

AN ORNAMENTAL WASTE BOX.

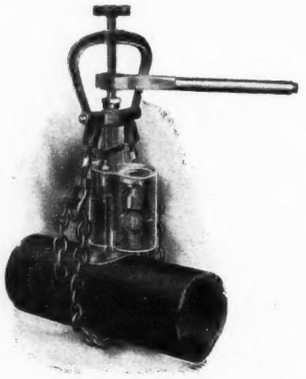
Mayor A. P. Wooldridge, of Austin, Tex., recently installed in the streets as an experiment a waste box of rather novel design. The "Dayton" waste box, which is here illustrated, is made of cast-iron and in appearance is an ornamental flower vase on a rather elaborate pedestal. In summer it holds flowers and in winter some evergreen plant. Immediately under the vase, at the top of the pedestal, is a hinged panel which may be pushed in and any waste dropped in. Under this opening is held a long gunny sack in the interior of the stand. Another panel, which is locked, beneath the first, may be taken out, and through the opening sacks are removed and replaced. The height of the whole is 5 feet 4 inches; the vase has a diameter of 20 inches and the base 22. The weight of the box is 280 pounds. The whole is painted and bronzed in copper or old gold finish and may have inscriptions or street signs on the panels. The box is made by the Kramer Bros. Foundry Co., Dayton, O.

"NEW ECLIPSE" TAPPING MACHINE.

For Long Main End Corporation Cocks.

Payne's Patent "New Eclipse" Tapping Machine is a simply constructed machine for tapping water mains on other pipes under high pressure. It has no valve or pet cock to get out of order and no revolving head to get sprung or joint to leak. The design of this machine is claimed to have been reduced to the limit of simplicity. In this tapping machine the pressure or strain of the feed screw pulls directly on the chain, thus relieving the machine of all undue strain. Bronze is used in the construction of these machines, while the saddles are made of malleable iron. The machine is made in four sizes—No. 1½ being for all sizes of taps up to and including 1 inch and No. 2½ for all sizes up to 2 inches, inclusive. The smaller machine with all necessary equipment weighs 34 pounds, while the other weighs 76. Every machine is tested to 600 pounds per square inch. Tapping may be done on top or side or any desired angle.

These tapping machines, which are illustrated here, are made by the Hays Mfg. Co., Erie, Pa.



"NEW ECLIPSE" TAPPING MACHINE.

INDUSTRIAL NEWS.

Cast-Iron Pipe.—Chicago—Order for 3,000 tons is to be placed shortly at Cleveland, O., and bids received at Los Angeles for 750 tons and Pasadena, Cal., for 150 tons. Municipal outlook meagre. Quotations: 4-inch, $26; 6 to 12-inch, $24; 16-inch and up, $23.50. Birmingham—Trade dull. Quotations: 4-inch, $20; 6-inch and upward, $18. New York—Department of Water opened bids on 195 tons 8-inch. Municipal lettings slight. Quotations: 6-inch, $20 to $20.50.

Lead—Quotations: New York, $3.50; St. Louis, $3.375.

The American Society of Municipal Improvements.

Among the literature distributed by exhibitors at the recent convention were the following:

Barber Asphalt Paving Co., Philadelphia, Pa.—Three illustrated booklets: "The World's Greatest Asphalt Plant," describing the Maurer, N. J., works of the company and illustrating its large capacity; "The Wonderland of Trinidad," describing the remarkable lake of asphalt in the island of Trinidad, and "Evidence," illustrating numerous streets paved with Trinidad Lake asphalt.

The U. S. Asphalt Refining Co. (the Inter-Ocean Oil Co.), 90 West Street, N. Y.—Interesting booklet describing the use of Aztec asphalt in many cities.

Robeson Process Co., Pennington, N. J.—Booklet describing and illustrating the use of Glutrin, the vegetable binder and sprinkling material.

The Okonite Company.—W. T. Kyle has joined the sales force of this company at their general office, 253 Broadway, New York City. Mr. Kyle for past six years has been connected with the Duplex Metals Company as district sales manager.

Hendricks' Commercial Register.—The Twenty-third Annual edition of Hendricks' Commercial Register of the United States for Buyers and Sellers has just been issued. It is announced by the publishers as by far the most complete edition of this useful work that has been issued. Many new features have been added; thousands of trade names and titles of identification have been inserted and numerous duplications expunged. "The Assistant Buyer," formerly published by the Sullivan System, has been incorporated with it, and the entire work has been thoroughly revised and improved in every detail. This publication is claimed to contain complete lists of manufacturers of everything required in municipal and government work, also lists of asphalt paving contractors, dredging contractors, and building and general contractors, which includes public works, railroad and other contractors. It numbers some 1,600 pages and contains about 350,000 names and addresses, with upwards of 45,000 Business Classifications; 138 pages are required to index its contents. Hendricks' Commercial Register has been in existence nearly a quarter century. It is published by S. E. Hendricks Co., Inc., 2 West 13th St., New York City. It is used extensively throughout the United States and many foreign countries for purchasing purposes by corporations, governments, associations, manufacturers, exporters, purchasing agents and sales managers and it is considered standard in its field. The price of the volume is $10.00, carriage charges prepaid.

NEWS OF THE SOCIETIES.

(Continued from page 573)

Lock Joint Pipe Company, New York City; Lock Joint sewer pipe. Photographs and literature.

Warren Brothers Company, Boston; Bitulithic, bitustone, endurite, Warrenite. Samples and literature.

Standard Oil Company of New York; refined Mexican asphalt. Samples and literature.

League of American Municipalities.

John J. Ryder, of Omaha, president of the League of American Municipalities, opened the eighteenth annual convention in Milwaukee, Sept. 29, with a review of the work of the organization during the past year. With the exception of this address the work of the first half-day was mostly informal. In the afternoon work was started in earnest. Martin Behrman, mayor of New Orleans told of sewerage, water and drainage in his city, and Calvin Henrichs, of Baltimore, told of the same sort of work in his more northern city. The ambitious plans for the new sewer system in Milwaukee were explained by T. Chalkley

(Continued on page 592.)

ADVANCE CONTRACT NEWS

ADVANCED INFORMATION BIDS ASKED FOR

CONTRACTS AWARDED ITEMIZED PRICES

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
			STREETS AND ROADS.	
Ind.,	Spencer	2 p.m., Oct. 17.	Grading, paving and improving road	G. W. Stwalley, Aud. Owen Co.
N. Y.,	Binghamton	Oct. 17.	Construction of curb and gutters	Board Contract & Supply.
N. C.,	Asheville	Oct. 17.	Grading and resurfacing with bituminous binders	C. A. Neal, Co. Engr.
Ind.,	Spencer	2 p.m., Oct. 17.	Construction of macadam roads	G. W. Stalley, Co. Aud.
Mont.,	Glendive	Oct. 19.	Constructing sidewalks	City Clerk.
La.,	New Orleans	Noon, Oct. 19.	16½ miles highway construction	W. E. Atkinson, State Engr.
Ill.,	Quincy	3 p.m., Oct. 19.	Combination concrete curb and gutter	F. E. Whipp, Supv.
Ill.,	Cairo	11 a.m., Oct. 19.	35,000 yds. macadam paving, 22,000 ft. concrete curb and gutter	Walter H. Wood, B. L. I.
Kan.,	Atchison	Noon, Oct. 19.	Improving Leavenworth branch road	C. M. Bolker, Co. Engr.
N. J.,	Elizabeth	8 p.m., Oct. 19.	Macadamizing road	Township Committee.
Ind.,	Vincennes	4 p.m., Oct. 19.	580 yds. cement sidewalk, 1,050 ft. limestone curbing	Board Public Works.
Colo.,	Pagosa Springs	Noon, Oct. 19.	Construction of state highways	F. Catchpole, Secy.
Ind.,	Indianapolis	10 a.m., Oct. 19.	Grading and paving various streets	Board Public Works.
Cal.,	San Jose	11 a.m., Oct. 19.	Improving the Alameda in road district No. 4	H. A. Pfister, Clk.
Kan.,	Salina	Oct. 19.	Alley paving	City Council.
Ind.,	Vincennes	Oct. 19.	Laying sidewalks	City Clerk.
Wash.,	Calumet	Oct. 19.	Constructing sewers	Town Council.
Minn.,	Duluth	10 a.m., Oct. 19.	Grading, paving and improving alley	C. S. Palmer, City Clk.
O.,	Dayton	10 a.m., Oct. 20.	Completing bridge and roadway	W. S. Asling, Sec. Co. Comrs.
O.,	Green Springs	Oct. 20.	8,000 yds. paving	Fred Reid, Clk.
O.,	Dayton	10 a.m., Oct. 20.	Excavation, grading and macadamizing	W. H. Aszling, Secy.
O.,	Kenton	Noon, Oct. 20.	Regrading and gravelling turnpikes	Comrs. Hardin Co.
Ill.,	Berwyn	8 p.m., Oct. 20.	Construction of sidewalks	Board Local Imp.
N. J.,	Bayonne	Oct. 20.	Improvement of 17 streets	Town Clerk.
O.,	Green Spring	Oct. 20.	8,230 yds. paving	W. P. Lee, City Clerk.
Pa.,	Allentown	5 p.m., Oct. 21.	100 tons crushed limestone	T. J. McNalley, Clk.
Ill.,	Chicago	11 a.m., Oct. 23.	Construction of cement sidewalk	Geo. A. Schiller, Pres. Imp. Bd.
N. J.,	Newark	3 p.m., Oct. 22.	Paving and repaving several streets	Board of Works.
Ill.,	Canton	11 a.m., Oct. 22.	Roads previously advertised for October 15	State Highway Com.
N. Y.,	Lockport	2 p.m., Oct. 22.	Construction of 4 miles state highway	Fred H. Krull, Chr. Bd. Supv.
Ill.,	Springfield	11 a.m., Oct. 22.	$33,000 worth of brick paving	P. C. McArdle, Actg. Ch. Engr.
O.,	Cincinnati	Noon, Oct. 23.	Widening of Drake Ave. and repair of Hooben road	Albert Reinhardt, Clk.
O.,	Cincinnati	Noon, Oct. 23.	Improving and widening certain streets, also repairing	P. Fosdick, Dir. P. S.
Ill.,	Antioch	2 p.m., Oct. 24.	Grading, draining and surfacing road	Comrs. of Highway.
O.,	Columbus	Noon, Oct. 24.	Labor and materials for constructing stone sidewalk	Council of Village of Linden Heights.
Wash.,	Olympia	Oct. 26.	Two miles of crushed rock highway	State Highway Com.
Ind.,	Vincennes	4 p.m., Oct. 26.	29,000 sq. yds. paving, including laying 1,800 ft. of curb, 1,600 ft. vitrified pipe, 6 manholes and 18 storm water inlets	Board Public Works.
Ind.,	Monticello	10 a.m., Oct. 26.	Grading, draining and improving road in one township	A. G. Fisher, Co. Aud.
O.,	Toledo	Oct. 27.	Grading, curbing and macadamizing Lockwood Ave	County Commissioners.
Ind.,	South Bend	10 a.m., Oct. 27.	Water and sewer connections on street improvement work	V. C. Sweeney, Clerk.
N. J.,	Elizabeth	8 p.m., Oct. 27.	Laying bluestone sidewalk with necessary grading and filling	C. H. Smith, Boro. Clk.
Ala.,	Wedowee	Oct. 28.	$8,000 grading and surfacing road	W. S. Keeler, Highway Engr.
N. Y.,	Albany	1 pm., Oct. 30.	Improvement of 103.77 miles state highway	R. K. Fuller, Sec. State Highway Com
Ala.,	Camden	Nov. 2.	Grade, drain and surface with chirt, about $12,000	County Comrs.
Ind.,	Shelbyville	11 a.m., Nov. 4.	Improvement of highways by grading, draining and paving with gravel. Four contracts: 22,849 ft., 9,500 ft., 14,900 ft., and 11,700 ft	F. W. Fageo, Aud.
Md.,	Baltimore	Noon, Nov. 5.	Various pieces of state road	State Roads Com.
			SEWERAGE.	
O.,	Canal Dover	Noon, Oct. 17.	Screen and sludge ejector	W. E. Sikes, Clk.
Cal.,	Los Angeles	2 p.m., Oct. 19.	Additions to storm drain	Board Supv.
Ind.,	Indianapolis	10 a.m., Oct. 19.	Construction of local sewers	Board Public Works.
Mich.,	Bay City	9 a.m., Oct. 19.	Constructing 12-inch socket tile sewer	Board Public Works.
N. J.,	Camden	8 p.m., Oct. 19.	Construction of various sewers	Committee Streets & Hwys.
Minn.,	Brainerd	8 p.m., Oct. 19.	Construction of district sewer	V. N. Roderick, City Clk.
N. Y.,	Newburgh	Oct. 20.	Construction of two sewers	City Council.
N. Y.,	Buffalo	11 a.m., Oct. 20.	Sewers in sundry streets	Dept. Public Works.
Ga.,	Augusta	Oct 20.	Extension of sewer	River & Canal Com.
Pa.,	Pittsburgh	7 p.m., Oct. 20.	Grading and laying 700 ft. of 10-inch sewer	H. J. Barnes, Springdale, Pa.
N. J.,	Atlantic City	Oct. 20.	85,000 ft. ditching	Thos. J. Headley, Ex. Off.
S. C.,	Charleston	10 a.m., Oct. 20.	1,400 ft. clay and tile pipe	Bureau Supplies & Accounts, Washington, D. C.
Ind.,	South Bend	10 a.m., Oct. 20.	Pipe sewer	Board Public Works.
Pa.,	Chester	8 p.m., Oct. 20.	Construction of pipe sewers	Wm. Pendlebury, Secy., Cardington, Pa.
O.,	Canton	Noon, Oct. 21.	Construction of storm water and sanitary sewers	Z. W. Kent, Dir. Pub. Service.
Mass.,	New Bedford	Oct. 21.	Centrifugal pumps and motor for sewage system	Board of Aldermen.
N. J.,	Jersey City	2 p.m., Oct. 22.	Collection and removal of ashes, garbage and refuse for one year	M. J. Fagen, Clk.
N. J.,	Clinton	Noon, Oct. 22.	Construction of sewer and sewage disposal plant	Bd. of Managers, Reformatory for Women.
N. J.,	Newark	3 p.m., Oct. 22.	Construction of a sewer in St. Charles St	Board of Works.
Ill.,	Chicago	Oct. 23.	Construction of sewer manhole, catch basin, etc	E. J. Glackin.
S. C.,	Mullins	4 p.m., Oct. 29.	Six miles of sewer pipe and laying	Board Public Works.
Tex.,	Corpus Christi	Nov. 3.	Constructing garbage crematory	City Clerk.
O.,	Minerva	Noon, Nov. 4.	Construction of storm sewer	Austin Freed, Vil. Clk.
Kan.,	Hutchinson	Nov. 6.	1½ miles of sewer main and sewage pumping plant	City Clerk.
Ill.,	Chicago	Noon, Nov. 14.	Sewer and water extensions	Sewerage & Water Board

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
La.,	New Orleans	Noon, Nov. 14.	Sewer extensions, water extensions, connections to sewers and water mains, etc.	F. S. Shields, Sec. Sew. & Water Board.
Ia.,	Iowa Falls	Nov. 15.	Sewer and water extensions, $20,000	J. H. Farrington, City Engr.
WATER SUPPLY				
N. Y.,	Lyons	Oct. 17.	C.-i. pipe and special castings for water works system, being approximately 13½ miles for 6, 10 and 12-in. pipe.	Village Clerk.
S. D.,	Mobridge	9.30 a.m., Oct. 19.	1,100 ft. of 6-in. water pipe, 366 ft. 4-in. water pipe	W. L. Youngman, City Aud.
Minn.,	Virginia	7 p.m., Oct. 19.	Furnishing and installing two boilers	J. W. Murphy, Secy.
Tex.,	Dallas	1 p.m., Oct. 20.	1,500 ft. ditch, 19½ ft. deep, and 15,000 gallon reservoir	P. E. Ashworth, Secy.
O.,	Cleveland	Noon, Oct. 21.	Furnishing low-lift steam pump	Comr. of Purchases.
O.,	Columbus	Noon, Oct. 21.	50 fire hydrants	R. L. Barger, Dir. Pub. Safety.
N. J.,	Clinton	Noon, Oct. 22.	Construction of water works system	Bd. of Managers, Reformatory for Women.
Mont.,	Billings	2 p.m., Oct. 22.	Earth work and structures in water works extension	U. S. Reclamation Service.
Ill.,	Chicago	Oct. 23.	Cast-iron water pipe fittings and hydrants	E. J. Glackin.
Mo.,	Elsberry	1 p.m., Oct. 24.	Steam driven pumping plant	Board of Supv.
Fla.,	Palmetto	2 p.m., Oct. 26.	Pumping plant installation	A. M. Lamb, Pres. Council.
H. I.,	Honolulu	3 p.m., Oct. 27.	Constructing concrete water tower, tank, etc	O. Wenderoth, Superv. Arch., Washington, D. C.
S. C.,	Mullins	Oct. 29.	Constructing water works and sewerage	G. C. White, Engr., Charlotte, N. C.
S. C.,	Mullins	4 p.m., Oct. 29.	Construction of electric and gasoline pumping station, reservoir, tower and tank, 5 miles of water mains, and 6 miles of sewers	Board Public Works.
Va.,	Norfolk	Oct. 31.	$75,000 worth water meters	Board of Control.
Kan.,	Little River	About Nov. 1.	Constructing water system, cost $25,000	W. B. Rollins, Cons. Engr., Kansas City, Mo.
La.,	Houma	Nov. 6.	Electrical and pumping equipment	Mayor.
Cal.,	San Francisco	Dec. 1.	Construction of 2,000,000 gallon reservoir	Water Comr.
Greece,	Athens	1915, Mar. 30.	Water supply for Athens and additional cities, estimated cost, $14,000,000	Bur. of Foreign & Domestic Commerce, Wash., D. C.
LIGHTING AND POWER				
Ia.,	Sargent Bluffs	Oct. 17.	Engine, generator, storage battery and switchboard; also erection of power house and pole line	Village Board.
Ind.,	Newcastle	7.30 p.m., Oct. 19.	Extension of water and light plant	Common Council.
N. J.,	Sayreville	Oct. 21.	15 arc lights, 130 incandescent lights for street lighting	Township Committee.
N. Y.,	New York	Oct. 22.	Conduit and wiring system and lighting fixtures	O. Wenderoth, Wash., D. C.
W. Va.,	Wheeling	Oct. 26.	Furnishing water turbines and air compressors	J. P. Jervey, Con. Engr.
Australia,	Sydney	Oct. 26.	Supplies delivered and erection of wet air filters	Municipal Council.
Pa.,	Williamsport	10 a.m., Oct. 26.	Street lighting for period of three years	Samuel Stabler, Supt. P. Aff.
Pa.,	Allentown	5 p.m., Oct. 26.	Installation and operation of street lights	J. H. Gehris, Secy.
O.,	Toledo	Nov. 6.	Construction of power house and equipment for power plant	Board Co. Comrs.
Ill.,	Collinsville	Nov. 6.	Lighting and fixtures for post office	O. Wenderoth, Wash., D. C.
Ill.,	Canton	Nov. 10.	Lighting and fixtures for post office	O. Wenderoth, Wash., D. C.
FIRE EQUIPMENT				
Pa.,	Glenlyon	7 p.m., Oct. 19.	Two-story bridge hose house	Newport Twp. Com.
Mont.,	Helena	Oct. 19.	1,000 feet of hose	Percy Witmer, City Clk.
N. J.,	Passaic	8 p.m., Oct. 26.	Fire alarm system	Fire & Water Committee.
Ont.,	Toronto	Oct. 31.	Supplies and fire alarm equipment	H. C. Hocken, Mayor.
Cal.,	Fresno	9 p.m., Nov. 2.	5,000 ft. 2½-in. hose, 2,500 ft. 1½-in. hose	W. H. Ryan, City Clk.
BRIDGES				
Ind.,	Richmond	11 a.m., Oct. 17.	Culverts and bridges	L. S. Bowman, Aud. Wayne Co.
Ill.,	Rockford	1.30 p.m., Oct. 17.	Reinforced concrete bridge to cost about $1,800	R. A. Carter, Supt. Hwys.
Minn.,	Marshall	2 p.m., Oct. 17.	1 bridge, 1 reinforced concrete culvert	L. E. Peterson, Twn. Clk
O.,	Warren	1 p.m., Oct. 19.	Bridge in Idylwild Park	W. P. Harrington, Co. Aud.
Cal.,	San Diego	Oct. 19.	Reinforced concrete bridge	Board Supv.
O.,	New Philadelphia	Oct. 19.	Creosoted block floor for bridge	Co. Comrs.
Ill.,	Vienna	11 a.m., Oct. 19.	Reinforced concrete bridge, to cost $700	C. A. Hook, Supt. Hwys.
O.,	Bellaire	1 p.m., Oct. 19.	Reinforced concrete bridge	Emerson Campbell, Aud.
Ga.,	Rome	Noon, Oct. 19.	Concrete bridge	K. Lindsey, Lloyd Co. Engr.
Pa.,	Pittsburgh	Noon, Oct. 20.	Steel girder bridge	R. J. Cunningham, Co. Cont.
Minn.,	Rochester	10 a.m., Oct. 20.	Steel for bridge	L. J. Fiegel, Aud.
Pa.,	Greensburg	Noon, Oct. 20.	Approaches to Nickerson bridge	J. S Sell, Controller.
Pa.,	Pittsburgh	Noon, Oct. 20.	Construction of bridge No. 21, over Pine Creek	R. J. Cunningham, Contr.
Minn.,	Rochester	Oct. 20.	Steel for bridge	Co. Auditor.
Ga.,	Danielsville	Oct. 21.	Steel bridge over Broad River	J. W. Draper, Supt. Rds.
O.,	Lima	Noon, Oct. 21.	Completing superstructure of bridge	H. J. Lawlor, Clk. of Bd.
Minn.,	Shakopee	11 a.m., Oct. 21.	State Bridge No. 1277	A. J. Mayer, Aud.
Tenn.,	Chattanooga	10 a.m., Oct. 22.	Constructing one bridge	Tennessee River Bridge. Com.
O.,	Urbana	10 a.m., Oct. 22.	Abutments for bridge, to cost about $1,600	Comrs. of Champaign Co.
Ind.,	Shelbyville	10 a.m., Oct. 22.	Repairs for bridges	F. W. Fagel, Aud.
O.,	Marietta	Noon, Oct. 23.	Substructure or masonry of bridge	W. B. Alexander, Co. Aud.
O.,	Cincinnati	Noon, Oct. 23.	Constructing concrete arch bridge	Board Co. Comrs.
O.,	Xenia	11.30 a.m., Oct. 23.	Truss steel bridge across Bear Branch	G. W. Kemble, Clk.
O.,	Marietta	Noon, Oct. 23.	Masonry for bridge	W. B. Alexander, Aud.
Ind.,	Indianapolis	10 a.m., Oct. 24.	Repairs to bridge	W. T. Patten, Aud.
Ark.,	Monticello	Noon, Oct. 24.	Steel bridge over Bayou Bartholomew	W. A. Coker, Co. Judge.
O.,	Akron	11 a.m., Oct. 25.	Construction of road culvert	C. L. Dower, Clk
O.,	Akron	Oct. 26.	Construction of culverts	Co. Comr.
Pa.,	Norristown	11 a.m., Oct. 26.	Paving bridge with creosoted blocks	J. M. Jacobs, Controller.
N. J.,	Perth Amboy	2.30 p.m., Oct. 26.	Construction of concrete and steel bridge	Board Chosen Freeholders.
Me.,	Portland	Noon, Oct. 26.	Bridge between Portland and South Portland	Cumberland Co. Comrs.
La.,	New Orleans	Oct. 26.	Trunnion bascule lift bridge	A. G. Ricks, Comr.
Kan.,	Ottawa	Oct. 29.	Concrete bridge	J. E. Rose, Aud.
Kan.,	Ottawa	Oct. 29.	Constructing stone pier substructure and one concrete abutment of bridge	J. E. Roose, Co. Aud.
Me.,	Portland	Nov. 2.	Constructing bridge	County Comrs.
Me.,	Portland	Noon, Nov. 2.	Construction of bridge between Portland and South Portland	Board Co. Comrs.
O.,	Painesville	Nov. 2.	Constructing steel highway bridge	Co. Comrs.
O.,	Dayton	10 a.m., Nov. 6.	Materials and labor for construction of a 6-span steel bridge	W. H. Aszling, Secy.
S. D.,	Britton	1 p.m., Nov. 10.	Bridges and culverts	Comrs. Marshall Co.
Neb.,	Ord	Nov. 17.	Concrete girder bridge	Co. Clerk.
MISCELLANEOUS.				
N. J.,	Little Falls	8.30 p.m., Oct. 19.	Erection and completion of municipal building	Township Committee.
Wash.,	Seattle	Oct. 19.	Furnishing 14,000 barrels American Portland cement	Quartermaster.
N. Y.,	Buffalo	Oct. 19.	Repairs to City Normal School	Dr. T. E. Finnigan, City Comr.
Ill.,	Springfield	Oct. 19.	Construction of several buildings at various state hospitals and farms	State Board Administration.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
R. I.,	Pawtucket	11 a.m., Oct. 20.	Construction of quay wall	State Harbor Imp. Com.
D. C.,	Washington	Oct. 20.	Materials for the Bureau of Supplies and Accounts	Navy Department.
Miss.,	Meridian	2 p.m., Oct. 20.	Heating, plumbing and wiring City Hall	City Clerk.
N. Y.,	Albany	Noon, Oct. 20.	Improving Cayuga and Seneca Canal	D. W. Peck, Supt. P. Wks.
Del.,	Wilmington	11 a.m., Oct. 20.	Materials for county and city building	Thos. F. Gormley, Clk.
Ill.,	Chicago	11 a.m., Oct. 21.	Labor and material to repair dock	Board Public Works.
N. Y.,	Brooklyn	11 a.m., Oct. 21.	Repair of mechanical plant at Caisson No. 2, Coney Island, upon three alternative propositions	President of Borough.
Ill.,	Chicago	11 a.m., Oct. 22.	One dust arrestor and cinder mill	L. E. McGann, Com. Pub. Wks.
Ill.,	Chicago	11 a.m., Oct. 23.	Furnishing 200 steel dump cars	L. E. Meljann, Com. Pub. Wks.
N. Y.,	Buffalo	4 p.m., Oct. 23.	Construction of armory	F. W. Ward, Albany.
N. Y.,	Hudson	2 p.m., Oct. 23.	State Hospital building	Miss Mary Hinckley, Pres.
D. C.,	Washington	Oct. 27.	Complete construction of Post Office at Carnegie, Pa.	Supv. Architect.
Tex.,	Corpus Cristi	Nov. 3.	Constructing garbage crematory or incinerator	City Clk.
Ill.,	Canton	3 p.m., Nov. 10.	Construction of two-story post office	O. Wenderoth, Wash., D. C.
Ore.,	Dalles	Nov. 12.	Federal building	Architect, Washington, D. C.
Va.,	Norfolk	Jan. 16.	150 ton capacity floating revolving crane; cost, about $450,000	Bur. Yds. & Docks, Navy Dept., Wash., D. C.

STREETS AND ROADS

Gadsden, Ala.—Ordinance providing for curb and gutter on Walnut St. has been passed. A call for bids will be issued and contractors will be asked to accept contract with understanding that they will be paid when bonds can be sold. The bonds will amount to about $7,500.

Dixon, Cal.—Highway Commission will advertise for bids in October or early November to construct Dixon unit of highway.

Marysville, Cal.—At meeting of M. M. & E. resolution was adopted favoring construction of lateral from main trunk of State highway from Marysville to Downieville via Smartsville, Nevada City and Camptonville. Proposed route from Camptonville to Downieville would follow along north fork of the Yuba River.

Red Bluff, Cal.—Meeting of Main St. property owners, held at City Hall to discuss question of paving that thoroughfare, proved majority of property owners are in favor of improvement and that bond election will be called at early date.

Red Bluff, Cal.—Arrangements are being made to pave main business streets of Red Bluff, Tehama Co.

Riverside, Cal.—Bids have been invited for improvement of Herndon Ave.

San Francisco, Cal.—Paving of Montgomery St. has been petitioned for.

San Francisco, Cal.—Paving of Union St., between Stockton and Kearny Sts., with basalt blocks in middle and asphalt on sides, as requested by association, has been adopted by authorities. Paving of Filbert St. below Kearny with asphalt, so as to form smooth walk in front of Garfield School, was also ordered by Board of Public Works. Other street improvements which North Beach Promotion organization is engaged in promoting are bituminizing of Broadway, between Mason and Powell Sts., and North Point, between Hyde and Larkin Sts. Powell St., from Broadway to the Embarcadero, has been recommended by Board of Works for repaving.

San Francisco, Cal.—Works Board has authorized paving of California St., between 27th and 32d Aves.; west half of Polk St., from Francisco to Bay; south half of Jefferson between Leavenworth and Hyde, and Lower Terrace from Seventh to Juno. A resolution to pave Polk St., from Greenwich to North Point was adopted.

Danbury, Conn.—State Highway Commissioner Bennett has notified Selectman Stephen B. Treadwell that plans and specifications for proposed trunk highway through Mill Plain to New York State line had been completed, and that formal call for proposals for contract would be issued during present week.

Boulder, Colo.—A movement has been started by four Boulder banks to extend street paving ordered by Council upon request of majority of property owners on Pearl St. in front of Court House Square to 12th St.

Chicago, Ill.—Voters will pass on boulevard link plan at election on Nov. 3. This was made certain when City Council passed two ordinances on the subject. One of them approved $3,800,000 bond issue with proceeds of which will be defrayed "public benefit" portion of $8,000,000 project for widening Michigan Ave. and Pine St. and connecting them across river by two level roadways and bridge. Second ordinance required Board of Election Commissioners to place bond issue proposition on ballot.

Chicago, Ill.—County Clerk Sweitzer has announced that the $2,000,000 bond issue for good roads in Cook Co. under Tice good roads law will go on ballot at November election.

Chicago, Ill.—The $8,000,000 boulevard link to unite South Side boulevard system with Lincoln Park should be under way by next March. Bond issue will be voted on in November. Edward J. Glackin is Secretary Board of Local Improvements.

Ottawa, Ill.—Only bid received for paving east hill on south side was from Joseph Leix for $4,573. Engineer's estimate was $4,447. Bid was placed on file according to law.

Covington, Ind.—No bids have been received on $95,000 of gravel road bonds offered for sale by county treasurer.

Fort Wayne, Ind.—Board of Works has announced that it will shortly be finally decided what disposition will be made of North Bloomingdale sewer muddle. Board will decide to accept sufficient maintenance bond rather than lop $450 from contract price, as was at first intended. Board has adopted resolution for paving St. Mary's Ave., from Beck to Burgess and ordered plans for walks on north side of Erie from Harmer to Begue and on both sides of Maumee from Harmer to Glasgow Ave.

Fowler, Ind.—The Harrington Road bonds in sum of $9,800 have been accepted here by J. F. Wild Co., of Indianapolis.

Richmond, Ind.—Notice is hereby given that on Wednesday, Oct. 21, 1914, until 10 o'clock a. m., Board of Commissioners of Wayne Co., State of Indiana, and county treasurer of said county will receive sealed bids for purchase of gravel road bonds of said county issued by said board upon petition of Orlando Marshall et al., for improvement of county line road between the counties of Wayne and Randolph, and the townships of Perry and West River therein.

Richmond, Ind.—City engineer has submitted final estimate on cost of opening up Richmond Ave., from West 5th to 8th Sts., as $7,002.93.

Council Bluffs, Ia.—Petition of Scott St. property owners that their street be paved north from Mill with concrete, presented at a previous meeting, has been granted and Council voted to include this piece of street in next batch of paving contracts to be let.

Keokuk, Ia.—City Council has passed resolution ordering construction of sidewalks, curbs and gutters at several different places in city. Walks 5 ft. wide have been ordered constructed along lots 7 to 12, inclusive, block 54, city, and along the front of lot 7, block 70, city. A walk 5 ft. wide and a curb were ordered along the rear 75 ft. of lot 7, block 95, city, and a gutter has been ordered along front of lot 6, block 182, city.

Coffeyville, Kan.—Petition signed by residents living in Patton's Addition asking for construction of sidewalk along north end of block 7 has been presented at commission meeting and granted. City attorney was instructed to draw up resolution for improvement.

Emporia, Kan.—Ordinance has been passed for improving of various streets.

Emporia, Kan.—Ordinance has been passed providing for issuance of internal improvement bonds of city of Emporia, Kan., for purpose of providing funds for payment of cost of grading, draining, curbing, guttering and paving of West St., from 12th Ave. to point 165 ft. north; 15th Ave., from Rural St. to Neosho St., and Seventh Ave., from Mechanic St. to Union St.

Taylorsville, Ky.—Bond issue of $20,000 for good roads will be voted on in November.

Cumberland, Md.—William S. Glenn, representing the banking firm of A. N. Leach Co., of New York, has made proposition to City Council to buy $150,000 paving bonds at par.

Hagerstown, Md.—County Commissioners have decided to have road running through town of Maugansville, across Cumberland Valley Railroad tracks, opened.

Lynn, Mass.—That city may be able to finish street work planned for this season, the Municipal Council has taken first step toward sale of bonds, amounting to $15,000, and has appropriated same to account of Street Department.

New Bedford, Mass.—Communication has been received from Mayor Ashley recommending loan orders for $20,000 for "highways, permanent improvements," and for $11,000 for "highways, macadam."

Salem, Mass.—It is estimated by city engineer of Sale that 9 miles of curbstones will have to be renewed on account of the fire, at cost of about $37,500, and 1,400 shade trees will be replaced at cost of $5,000.

Sheffield, Mass.—State Highway Commissioners are expected to ask for bids for construction of state road from Connecticut state line through Ashley Falls.

Detroit, Mich.—Henry B. Joy, president of Lincoln Highway Association, has launched first concerted movement for good roads in Michigan. Opening fire of attack is in form of petition directed to Gov. Ferris and signed by voters in every walk of life requesting that machinery of state be immediately set in motion to provide necessary funds and arrange logical program of state highway improvement.

Flint, Mich.—Common Council in executive session has practically decided to lay pavements on approximately 35 streets next year and in addition to construct subway beneath Pere Marquette R. R. tracks east of Buick factory No. 11, allowing for long-awaited extension of Leith St.

Highland Park, Mich.—Municipal paving plant is being considered.

Meridian, Miss.—Petition has been presented to Board, signed by large number of citizens, asking that bond issue be authorized for $50,000 to connect good roads with paved streets. Proposition has endorsement of Good Roads Commission of Beat 1, and will be passed while Board is in session. It provides for roads to college and also for Enterprise Road.

Maryville, Mo.—Street committee has been given power to purchase street grader this fall, to replace old one now owned by city.

St. Joseph, Mo.—Ordinances have been introduced for paving Penn St., from 29th to 30th St. with asphaltic concrete, and for paving Isadore St. with Bermudez asphalt macadam.

Hastings, Neb.—The Adams Co. Board of Supervisors has authorized expenditure of $2,600 of inheritance tax fund for improvement of roads in Adams Co. Board has apportioned money among board members with instructions to use it on certain needed improvements.

Elizabeth, N. J.—Recommendations of joint Finance and Streets Committees that $100,000 contract for resurfacing a number of telford streets be awarded to M. J. Leahy, of New York, has been defeated because it called for assessing cost upon general public.

Manasquan, N. J.—See "Miscellaneous."

Newark, N. J.—Property owners in Stengel Ave., between Elizabeth Ave. and Hunterdon St. have petitioned Board for bitulithic pavement on thoroughfare. Petition was referred to law department for investigation.

New Brunswick, N. J.—Ordinance has been adopted for improvement of number of streets. E. J. McMurty is City Clerk.

Paterson, N. J.—Two plans for improvement of Greenwood Lake glens have been submitted to Passaic County Board of Freeholders by County Engineer Garwood Ferguson. One plan, entailing expenditure of $30,000, provides for construction of road from Charcoal Road and improvement of latter. Other plans provides for bridge over Greenwood Lake Railroad and the Wanaque River.

Plainfield, N. J.—The City National Bank has offered to purchase $13,000 street improvement bonds at par and interest. These bonds are issued for three years and bear interest at 5 per cent. Offer of the bank was accepted.

Trenton, N. J.—County Road Supervisor Klockner, at meeting of road committee of Board of Freeholders, was ordered to apply asphaltic road oil to Windsor-Hightstown Road. Holes in thoroughfare will first be filled in and then material, which will be purchased from Standard Oil Co., will be applied. State Road Department has appropriated $4,000 for improvement of the road.

Albany, N. Y.—Bids will be received by John N. Carlisle, Commissioner, at 55 Lancaster St., for improvement of about 103.77 miles of highways in following counties: Broome, Chautauqua, 3 highways; Clinton, Erie, 6 highways; Herkimer, Madison, 2 highways; Monroe, Oneida, Onondaga, Rensselaer, Schoharie, 2 highways, and Sullivan Counties. R. K. Fuller is Secy.

Binghamton, N. Y.—Division Engineer Howard E. Smith has been advised by Highway Commissioner John N. Carlisle that contracts for construction of two short stretches of highway to connect new road running north and south through Windsor, will be let this fall. One of links is directly north of Windsor and other is to south of village. Total distance of stretches of road to be constructed according to plans prepared and accepted by State Highway Department officials is less than one mile.

Brooklyn, N. Y.—Engineers have completed their plans and contractors have been engaged to improve portion of Scarsdale Estates along Huntington Ave, from first section of Greenacres to New York Post Road. They will consist of grading streets and laying of sewer mains.

Canastota, N. Y.—At quarterly session of Board of Supervisors at Wampsville board voted unanimously to appropriate and make immediately available $6,840, county's share of cost of proposed road from Chittenango to Chittenango Depot. Section of highway is known as Chittenango-Lakeport, Part 1, county highway, and had been before Supervisors for consideration on two or three occasions. Section of road proposed for improvement extends from Tuscarora St., in Chittenango, to station, a distance of 1.87 miles, of which .16 miles is in corporate limits of Chittenango. Total cost is estimated at $22,800, of which state pays $15,960. Supervisors also made available by resolution introduced by Supervisor F. W. Marshall, of Stockbridge, $9,840, the estimated share for county to pay for proposed improvement of Oneida-Munnsville, Part 2, county highway. Section covered by resolution extends from south end of county highway No. 1160 southeasterly through hamlets of Stockbridge and Munnsville, 3.19 miles in town of Stockbridge. Total cost is estimated at $32,800, of which estate will pay $22,960.

Cape Vincent, N. Y.—It is planned to ask village trustees to call special election for purpose of voting on proposition to build cement road through Broadway from Market St. to Bay St. State is to build a 16-ft. road through this thoroughfare next summer, and it is proposed that village add to either side of this to make it at least 30 ft. wide. In this case village will have to construct 7 ft. on each side, and it is roughly estimated that cost would be about $5,000.

Kingston, N. Y.—Ordinance has been passed for grading, top-dressing, curbing, guttering and flagging McEntee St. from Hone St. to Pierpont St.

Lockport, N. Y.—Board of Supervisors on recommendation of highway committee has voted to have county superintendent of highways, Thomas M. Brennen, prepare plans and specifications for improvement of Shawnee Road, west of city, and Warren Corners Road, from Ridge to foot of Gooding St. hill at county roads.

Manhasset, L. I., N. Y.—Petition has been received by Town Board for construction of 4-ft. sidewalk on both sides of Jefferson Ave., from Warner Ave. to the Power House road.

Manhasset, L. I., N. Y.—Bids have been opened for construction of sidewalks on Forest Road, South Road, Maple Grove and West End Ave., Great Neck. J. Branerfortie was lowest bidder, with $1,725; Crampton Bros.' bid was $1,995; George Marshall, $2,307; F. S. Fulton, $2,138, and Cashman Bros., $21,737. Board did not award contract, but will do so at next meeting.

Utica, N. Y.—Ordinances providing for paving of various streets have been referred to committee on paving.

Theresa, N. Y.—By vote of 96 to 68 taxpayers have voted to curb streets and complete work of street improvement now being carried on by State Department of Highways. At special meeting proposition was carried and calls for expenditure of $6,000 or as much thereof as is necessary.

Cincinnati, O.—Resolutions have been adopted for construction of sewers in various streets.

Marietta, O.—Resolution has been passed for improvement of Gilman St.

Marietta, O.—Resolution calling for construction of 6-ft. cement sidewalks in front of Cadwallader property at Wooster and 7th Sts., and in front of McCormick, Riley and other properties at 5th and Montgomery Sts. have been introduced and read the first time.

Marietta, O.—City will go ahead without further delay with improvement of upper Gilman St., and will pave it from end of present paving to corporation line.

Mifflin, O.—At November election, voters of Mifflin Township will vote on proposition of issuing $30,000 bonds for improvement of road from Mansfield to Ashland and road from Mansfield to Wooster.

Newark, O.—Final legislation for paving of North Beuna Vista St., beween Indiana St. and north line of Daugherty Ave. has been passed.

Salem, Ore.—$60,000 will be sum apportioned to Jackson Co. from state highway fund, according to tentative arrangements made by State Highway Commission.

Sandusky, O.—Passed to its second and third reading, following presentation ordinance authorizing city auditor to borrow sum not exceeding $131,100 and to issue notes for same for street and sewer improvements, has been unanimously adopted by Council. Immediately following, Council passed like ordinance calling for loan of $5,450 to cover property portion of cost of improvements on Perry and Meigs Sts.

Canyonville, Ore.—Surveyors are hard at work running lines in Cow Creek Canyon to get best grade possible for highway. This part of road has been bugbear to travelers for years. Plan is to get good road through canyon to connect with Pacific Highway.

Hanover, Pa.—Ordinances have been passed for improvement of various streets.

Kittanning, Pa.—Council has adopted ordinance for paving of Hawthorne Ave.

Lewistown, Pa.—Ordinance has been adopted for loan of $22,500 for various street improvements.

New Castle, Pa.—City Engineer Milholland, Superintendent of Streets Lusk, Representative W. D. Walton and Attorney W. K. Hugus, will confer with State Highway Engineer Bigelow and Assistant Engineer Foster, in Pittsburgh, in effort to induce state to pave their share of Wilmington Ave. extension, which is a state road.

Philadelphia, Pa.—Members of Lancaster Ave. Business Men's Association have decided to ask councils to repave part of Lancaster and Haverford Aves.

Philadelphia, Pa.—Plans for improvements to cost about $1,000,000, half to be borne by city and half by Philadelphia & Reading Railway Co., involving abolition of grade crossings, elevation of railroad tracks and opening of Tulip and Emerald Sts. between Lehigh Ave. and Somerset St., will be presented to Public Service Commission at Harrisburg for its approval or disapproval.

Penbrook, Pa.—State aid for paving of Main St. has been assured. Bricks will be used.

South Bethlehem, Pa.—Plans and specifications for widening of Fourth St. from Hill St. east to city line, as prepared by City Engineer Frank H. Ville, have been submitted.

Wilkes-Barre, Pa.—The following ordinances have been presented for action, all having passed first reading at previous meetings: Authorizing grading, curbing and paving of North Empire St. between Market and Coal Sts., and Coal St., between Empire and Custer Sts.; authorizing grading, curbing and paving of Kidder St., Race St., Magnolia Ave., Kirkendall Ave., Foster lane and Amber lane; authorizing transfer of funds from one item in budget to another.

Williamsport, Pa.—Ordinance has been passed providing for grading and paving from curb to curb, with asphalt, block, brick, or other approved paving material, on concrete foundation, and curbing of all that portion of State St. from south side of East Third St. to north side of Church St.

Pawtucket, R. I.—Joint resolution, calling for appropriation of $15,000 to be expended in repair of highways has been passed by Board of Aldermen.

Providence, R. I.—Common Council has passed over Mayor's veto measure for paving Messer and Broad Sts. with bitulithic pavement.

Sioux City, S. D.—Contracts for paving of Tenth St., between Dakota and Covell Aves. will not be awarded until after result of special election called for October 20 on matter of issuing bonds to amount of $135,000 for water extensions and other improvements in that department.

Knoxville, Tenn.—County Road Commission has ordered four concrete culverts built. One of them is to be on Broadway pike, between Greenway and Arlington, another near Dante, third on road between Ebenezer and Blue Grass, and fourth on Clinton Pike. Work on these culverts will begin at once. It was also ordered that Fountain Ave., in Fountain City, be opened and made a public road, leading from the lake at Fountain City to Dry Gap Pike, a distance of about 600 yds.

Maryville, Tenn.—In form of resolution request was presented to court that $300,000 be voted on for pike roads and improvements in county pikes.

Galveston, Tex.—Commissioner Sappington has recommended to board that paving on Broadway be continued to east side of 40th St.

Sale Lake City, Utah.—E. R. Morgan, state road engineer, has made preparations for expenditure of $5,500 in improvements on road between Scipio and Holden in Millard County. Improvements will include grading and construction of two big concrete culverts.

Newport News, Va.—City Council finance committee recommends $1,000 appropriation for improving 33d St.

Everett, Wash.—Snohomish Co. Good Roads Association has voted to have proposition of bonding county for $1,500,000 for road purposes submitted to voters at fall election.

Everett, Wash.—Resolution has been passed that there be submitted to voters of county of Snohomish at election to be held at time of general election on Tuesday, the 3rd day of November, 1914, question whether the Board of County Commissioners shall be authorized to issue negotiable coupon road bonds for purpose of constructing new roads and improving established roads within said county as hereinafter set forth and in aiding therein, said roads forming and to become a part of public highway system of Snohomish County, to amount of $1,500,000, same to be issued in denominations of not less than $100, nor more than $1,000 each. It is proposed with this money to build 96 miles of hard surface main roads, and 56 miles of graded and graveled roads, reaching into nearly every portion of county.

Seattle, Wash.—Plans have been received from engineer for paving of 31st Ave. at cost of $14,800.

Seattle, Wash.—Improvement of various streets have been ordered.

Washburn, Wis.—A special meeting of Bayfield Co. board has been held here for purpose of making apportionment of work to be done on county highway system with state aid during year 1915. Sum of $24,900 was set aside from levy for highway purposes to be expended under direction of Wisconsin Highway Commission.

Niagara Falls, Ont.—Paving of Orchard St. at south end is being urged.

CONTRACTS AWARDED.

Huntington Beach, Cal.—Peason & Anderson were successful bidders for paving of 9th St., from Ocean Ave. to Main. Cost will be $14,956. Pavement will be of same character as that of Orange Co. boulevard—4-in. concrete base, with wearing surface of asphaltum.

Riverside, Cal.—For improvement of about a mile of extension of Magnolia Ave. to Johnson-Shea Co., Riverside, at $31,859.

Sacramento, Cal.—For improvement of alley between D and E Sts., to McGillivray Const. Co., at following bid: Per cu. yd. of excavation (grading), 80 cts.; per sq. ft. of asphaltic macadam pavement, complete, 16 cts.; per sq. ft. of concrete sidewalk 3½ ins. in thickness, 15 cts.; per sq. ft. of concrete sidewalk 5½ ins. in thickness, 20 cts.; per concrete catch basin complete with cast iron curb and cover, $35; per lin. ft. of 6-in. vitrified ironstone sewer pipe, in place, 50 cts. Also alley between E and F, to same firm, at following bid: Per cu. yd. of excavation (grading), 80 cts.; per sq. ft. of asphaltic macadam pavement, complete, 16 cts.; per sq. ft. of concrete sidewalk 3½ ins. in thickness, 15 cts.; per sq. ft. of concrete sidewalk 5½ ins. in thickness, 20 cts.; per concrete catch basin, complete with cast iron curb and cover, $35; per lin. ft. of 6-in. vitrified ironstone sewer pipe, in place, 50 cts.

Sacramento, Cal.—Bids for construction of 71 miles of roadway in Sacramento, Humboldt, Alameda, Imperial, San Luis Obispo, Solano and Santa Barbara Counties at cost of about $500,000 have been opened by State Highway Commission Oct. 5. Bid for Sacramento County calls for construction of a road 6.8 miles long, starting at Folsom and extending east to the county boundary line. A. W. Garrill, of San Francisco, was the lowest bidder on this road. He agreed to construct highway for $39,141. Engineer's estimate was $43,171.25. Estimates of highway engineer, together with lowest bidder on other contracts are as follows: Santa Barbara County, from Divide to Orcutt, 3.6 miles—Engineer's estimate, $20,333.67; material furnished by State, $22,899.45; F. Rolandi, San Francisco, $18,751.50. Solano County, from Vacaville to Batavia, 8.2 miles—Estimate, $48,295.50; material, $34,669.28; P. L. Burr, San Francisco, $44,679. San Luis Obispo, from San Luis Obispo Creek to Cuesta, 3.6 miles—Estimate, $87,365; material, $56,736.10; J. W. Colback, San Diego, $71,989.20. Humboldt, from Shiveley to Jordan Creek, 3.7 miles—Estimate, $36,294.50; material, $9,422; Crowley & Cloney, Eureka, $28,624.98. Humboldt, from Lalet to Beatrice, 4.3 miles—Estimate, $28,809.57; material, $2,549.06; Elsmore & Jacobs, Eureka, $18,777.80. Alameda, from easterly boundary to Altamont, 5.9 miles—Estimate, $45,879.25; material, $26,015.44; Palmer & McBride, San Francisco, $38,032. Santa Barbara, from Zaca Station to Los Alamas, 8.7 miles—Estimate, $68,841.87; material, $61,536.56; Rogers Bros. Co., Los Angeles, $62,679.50. Imperial, from Meyers Creek to Coyote, 6 miles—Estimate, $79,436; material, $25,922.25; J. W. Calback, San Diego, $68,145.90. San Luis Obispo, from Alascadero Creek to Paso Robles, 10 miles—Estimate, $53,779.17; material, $5,355.95; Enoch J. Hunt, Alameda, $46,605.65. Santa Barbara, from Stony Creek to El Capitan, 10.2 miles—Estimate, $93,487.06; material, $8,691.70; C. H. Hudson, Los Angeles, $79,191.40.

Santa Barbara, Cal.—For street and sewer work in Moreno-Grand-Valerio Improvement Districts, to F. R. Ritchie & Co., San Francisco, at $47,872. N. F. Hewitt Co., Los Angeles, bid $52,286.

Upland, Cal.—For improving 12th St., to George Snyder Contracting Co., Ocean Park.

Newark, Del.—At meeting of Council contract was awarded to Barrett Mfg. Co., 17 Battery Pl., to place coat of tarvia and screenings on section of Main St. recently built. Total cost will be about $800.

Decatur, Ill.—To McCalman Construction Co., city, for paving of Jasper St., at $16,736, by Board of Local Improvements.

Ft. Wayne, Ind.—To Chas. W. Eling, at $15,983, for building of Meyer gravel road on line between De Kalb and Allen Cos., by County Commissioners.

Kokomo, Ind.—J. H. Watson bid $990 on Virginia Ave. walks. H. B. Stewart bid $1,118. Lincoln Record was only bidder on North St. walks, his figures being $1.08 a lin. ft.

Scipio, Ind.—Contract for road No. 1 in Scipio Township has been awarded by Commissioners to Deal Ellison upon his bid of $12,375. Estimate was $13,790. Road is 10,560 ft. long. Specifications are those that will be used for all Allen County stone roads in the future. They are as follows: A 28-ft. roadbed in a 40-ft. roadway. The macadam roadway will be 12 ft. wide in the center of the roadbed. There will be three layers of stone. The first will be 4 ins. deep of 2½ to 3½-in. stone, the second 4 ins. of ½ to 1½-in. stone, and the third layer 4 ins. of screenings.

Dubuque, Ia.—Following bids have been received for improvement of Highland Place. Bid of C. B. McNamara & Co., new cement curb per lin. ft., 79 cts.; No. 1 asphaltic concrete per sq. yd., $1.99; No. 2 asphaltic concrete per sq. yd, $1.99; No. 3 asphaltic concrete per sq. yd., $1.89. Bid of Jas. F. Lee, new cement curb, per lin. ft., 60 cts.; No. 1 asphaltic concrete per sq. yd., $1.87; No. 2 asphaltic concrete per sq. yd., $1.84; No. 3 asphaltic concrete per sq. yd., $1.82. Contract was awarded to James F. Lee, work to be of No. 2 asphaltic concrete.

Iola, Kan.—To Hanreddy & Ross and J. E. Smith for paving and guttering at $4,724.14. O. W. Holmes is City Clerk.

New Albany, Ky.—By Board of Works, to James Appleby, contract for vitrified brick improvement of alley between Bank and Pearl Sts., from Market to Main, and contract for vitrified brick improvement of E. 10th St., from Spring to Market, to Goulding Bros.

Detroit, Mich.—For paving by Dept. Pub. Wks. contracts were awarded as follows: To F. Porath & Son, 306 Fe. Pe. Bldg., for grading, paving, etc., Fort St. with No. 2 cedar block on concrete foundation and Amherst curb stone or concrete curb, if Amherst is unavailable; total cost $13,852; for grading, paving, etc., of Trombley Ave., cost $3,773, and also to same contractor for grading, paving, etc., on Ferry Ave., 30 ft. wide, with reinforced concrete on concrete foundation, and Amherst curbstone or concrete curb, at $17,582. To E. Meridith Co., for grading, paving, etc., of Holcomb Ave., with reinforced concrete on concrete foundation, and Amherst curb, cost $22,647; to J. A. Mercier, 216 Hammond Bldg., for grading, paving, etc., Bethune Ave., with creosoted block on concrete foundation and Amherst curb, total $10,999; to Detroit Asphalt Paving Co., for grading, paving, etc., Romeyn Ave., 22 ft. wide, with sheet asphalt on concrete foundation, and Amherst curbstone, cost $8,923.

Brookston, Minn.—Three bids for construction of cement sidewalks have been considered by Council: Victor Nelson, of Superior, $1,025; Johnson & Swanson, of Superior, $917.50; the Phelps-Campbell Co., of Duluth, $588. Latter concern was awarded contract.

St. Paul, Minn.—Following contracts have been awarded: Curbing streets in St. Anthony Park North, Thornton Bros., $22,687. There is about 10 miles of curbing. Engineer's estimate was $20,110.75. Grading Winona St., Christ Johnson, $1,061. Engineer's estimate, $1,324.47. Grading Hatch St., from Dale to Kent St., Thornton Bros., $3,287. Engineer's estimate, $2,413.89.

Springfield, Mo.—By city, to Jarrett-Richardson Paving Co., at about $20,000, to pave Kimbrough St., from St. Louis to Elm St.

Kansas City, Mo.—By city, to Jaicks & Co., to pave Montgall St., from 15th to 18th St.; J. C. Lyle, at $7.896, 20th St., from Baltimore to Grand St., and E. D. Tyner & Co., at $7,391, 31st St., from McGee to Troost St.

Hackensack, N. J.—For improvement of Terrace Ave., to George Brewster.

Newark, N. J.—Contracts for the grading, curbing and flagging of Amsterdam St., from Niagara to Magazine St., and for the same work in Frankfort St., from Niagara to Magazine St., were awarded to William Ballard, 279 Runyon St., for $2,432.93 and $2,020.32 respectively. Contract for grading and curbing of Clifford St., from Jefferson to Van Buren St., was awarded to the Jackson Contracting Co., 113 Vesey St., for $3,317.16. Paving of Seymour Ave. with bitulithic pavement, from Bock to Renner Ave., was awarded to Standard Bitulithic Co., 810 Union Bldg. The Newark Paving Co., 133 1st St., was awarded the contract for the paving of St. Charles St. with granite block, from Berlin St. to Ave. L.

Westfield, N. J.—Contract to lay sidewalks in Myrtle Ave. and Grove St. has been awarded to Charles Lenz, of Rahway, and contract to improve Edgewood Parkway and Pleasant Pl., to Weldon Contracting Co., by Town Council.

Westfield, N. J.—For laying of 1,800 ft. of concrete sidewalk on Myrtle Ave. and Grove St., to E. W. Chamberlain, at $1,457.80, and for improvement of Edgewood Parkway and Pleasant Pl., to Charles Lenty, Jr., at $1,712.

Binghamton, N. Y.—For construction of concrete curb and gutter around park on Burton Ave. to Takach & Chappell, Binghamton, at 39 cts. per lin. ft.

Highland Mills, N. Y.—The Schunnemunk Construction Co. has received contract to repair road No. 156, a distance of 3 miles, between Goshen and Chester.

Newburgh, N. Y.—The James L. Kehoe Contracting Co., of this city, has been engaged by state highway department to complete work on Moodna-Cornwall road and make all necessary repairs to same.

New York, N. Y.—For regulating, grading, curbing and laying sidewalks, together with all work incidental thereto, in Thompson Ave., from Viaduct to Diagonal St., to Degnon Contracting Co., $10,515. Other bids as follows: Clancy & Nuhn Contracting Co., $10,907; Astoria Contracting Co., $11,634; Charles A. Meyers Contracting Co., $11,695; Welsh Bros. Contracting Co., $11,858; Evergreen Construction Co., $12,864; Thomas Crimmins Contracting Co., $13,992; Peace Bros., $14,215; L. S. Fulton, $15,060; Henry J. Mullen Contracting Co., $15,236; Leo E. Kelly, Inc., $17,503.

Schenectady, N. Y.—Bids have been received from three firms for construction of reinforced concrete culvert under New York Central tracks in Tenth Ward in connection with laying of 36-in. water main, as follows: H. K. Corbin & Co., 170 Broadway, New York, $4,995; W. D. Goodale, city, $5,745; John Allen, $5,250. The New York firm was given the contract.

Columbus, O.—Following contracts have been awarded by State Highway Department: Ashland Co., Pet. 967, I. C. H. 148, paving with brick, Sec. 1, Ashland-Shelby Rd., Montgomery Twp.; length, 710 ft., or 0.13 mile; width of pavement, 10 ft.; estimated cost, $2,029; awarded to D. A. Phillips, Ashland, O., at $2,000. Ashland Co., Pet. 962, I. C. H. 143, paving with gravel macadam Sec. H of Ashland-Londonville Rd., in Green Twp.; length, 19,898 ft., or 3.77 miles; width of pavement, 16 ft.; est. cost, $29,489.69; awarded to D. A. Phillips, Ashland, O., at $25,937. Columbiana Co., Pet. 1454, I. C. H. 384, paving with brick, Sec. 2, Salem-Hanoverton Rd., Butler Twp.; length, 3,277 ft., or 0.62 mile; width of pavement, 10 ft.; estimated cost, $10,025.05; awarded to Jesse D. Paxson, Salem, O., at $9,688.05. Cuyahoga Co., Pet. 1385, I. C. H. 36, paving with brick and one course concrete pavement, Sec. A, Twinsburg-Elyria Rd., Strongville and Royalton Twps.; length, 31,024 ft., or 5.90 miles; estimated cost of construction, $152,540.50. Alternative bids will also be received for constructing bridges and culverts, grading and paving the roadway with brick, and two course concrete pavement; estimated cost, $150,368.50. Bidders were the Cleveland Trinidad Paving Co., Cleveland, O.; the Enterprise Paving & Construction Co., Cleveland, O.; Geo. B. Herring & Son, Cleveland, O. Award withheld. Gallia Co., M. M. XII, the Centerville-Vinton Rd., in Raccoon Twp.; length, 8,600 ft., or 1.63 miles; estimated cost, $7,302.24; to James C. Voelker, Thurman, O., at $7,302.24. Harrison Co., Pet. 938, I. C. H. 26, paving with water bound macadam, Sec. A, Steubenville-Cambridge Rd., Archer and Green Twps.; length, 10,485 ft., or 1.98 miles; width of pavement, 12 ft.; estimated cost, $18,710.12; awarded to J. P. Warnick, Cadiz, O., at $17,143. Highland Co., Pet. 1525, I. C. H. 459; paving with water bound macadam the Allensburg-Lynchburg Rd., Dodson Twp.; length, 5,556 ft., or 1.05 miles; width of paving, 14 ft.; estimated cost of construction, $7,730.09; awarded to Ed. Bean, Highland, O., at $7,730.09. Hocking Co., Pet. 1007, I. C. H. 363; paving with water bound macadam, the Chillicothe-Logan Rd., in Goodhope Twp.; length, 8,745 ft., or 1,65 miles; estimated cost, $15,696.36; awarded to J. A. Jones, Ironton, O., at $15,550. Holmes Co., Pet. 885, I. C. H. 341; paving with water bound macadam dam and concrete, Sec. 5 of Millersburg-Canal Dover E. Rd., in Berlin Twp.; length, 3,504 ft., or 0.66 mile; estimated cost, $9,910.03; awarded to P. M. Deetz, Millersburg, O., at $9,792. Jackson Co., M. M. 12, Columbus-Ironton Rd., Madison Twp.; length, 14.848 ft., or 2.81 miles; estimated cost, $12,739.77; no bids received. Jefferson Co., Pet. 660, I. C. H. 75; paving with water bound macadam, Sec. 2, Canton-Steubenville Rd., Springfield Twp.; length, 8,550 ft., or 1.62 miles; width of pavement, 14 ft.; estimated cost, $23,798.22; awarded to Wolfe & Seeple,

Toledo, O., at $21,000. Jefferson Co., Pet. 1231, I. C. H. 7; paving with brick, Ohio River Rd., Island Creek Twp.; length, 5,120 ft., or 0.97 mile; width of pavement, 16 ft.; estimated cost, $21,722.90; awarded to Andrew W McDonald, Steubenville, O., at $20,500. Madison Co., Pet. 1261, I. C. H. 244, paving with water bound macadam, Washington-London Rd., Paint and Range Twps.; length, 32,582 ft., or 6.17 miles; width of pavement, 14 ft.; estimated cost, $58,585.77; awarded to J. M. Snouffner, Columbus, O., at $57,000. Madison Co., Pet. 1252, I. C. H. 239; paving with water bound macadam, Sec. C., Marysville-London Rd., Union and Deer Creek Twps.; length, 30,360 ft., or 5.75 miles; width of pavement, 14 ft.; estimated cost, $48,878.44; awarded to J. M. Snouffner, Columbus, O., at $47,400. Pike Co., I. C. H. 5, Portsmouth-Columbus Rd., Scioto Twp.; estimated cost of bridge, $1,412.60; awarded to Brookville Bridge Co., Brookville, O., at $1,220. Vinton Co., I. C. H. 397; paving with water bound macadam, the McArthur-Logan Rd., in Elk and Swan Twps.; length, 13,200 ft., or 2.5 miles; estimated cost, $24,317.54; awarded to J. R. Freiner, Hamden, O., at $23,711.54. Mahoning Co., Pet. 1080, I. C. H. 18; paving with brick, Sec. H, the Akron-Youngstown Rd., in Austintown and Jackson Twps.; length, 29,877 ft., or 5.66 miles; width of pavement, 16 ft.; estimated cost, $83,-433.50; awarded to W. E. Ule, Ravenna, O., at $75,688.53. Summit Co., Pet. 1370, I. C. H. 95; paving with wood block, Sec. A, the Akron-Medina Rd., in Portage Twp.; length, 2,000 ft., or 0.38 mile; estimated cost, $25,927.29; awarded to Wilds & Davidson, Akron, O., at $23,589.

Tulsa, Okla.—By city, to E. P. McCormick, at $8,171.37, to pave with asphaltic concrete on concrete base, Norfolk Ave., from Admiral Ave. to 4th St., and 3d St., from alley in block 10 in Hodge Addition to Norfolk Ave. E. B. Cline is City Auditor.

Harrisburg, Pa.—Contracts have been awarded by State Highway Commissioner E. M. Bigelow on two state-aid highways and also for removal of material from bed of Turtle Creek.

The Tionesta Boro., Forest Co., contract was awarded to Lawrence Schultz, of Fredonia, N. Y., at his bid of $5,098, subject to his ability to satisfy State Highway Department that he is able to do the work.

In the contract for work in Mill Creek Twp., Erie Co., two types of bids were asked. There is a railroad company occupying part of the highway. If they agree to sign up with State Highway Department for part of cost of construction, one type of bid will be accepted; if they do not agree other bid will be accepted. If they sign agreement contract is awarded to L. Vincent Metz, of Erie, Pa., at his bid of $56,807; if railroad company refuses to sign up, the contract will be awarded to the National Supply & Construction Co., of Ellwood City, Pa., at their bid of $35,143.

Bids received for brick block pavement, 1,050 ft. in length, in Tionesta Boro., Forest Co., extending along Elm St. from the end of the present brick pavement to the bridge over Tionesta Creek, were as follows: Lawrence Schultz, Frdeonia, N. Y., $5,098; E. M. Love & Son, Corry, Pa., $5,249.70; H. C. Bunce, Olean, N. Y., $5,743.60; R. B. Taylor, Bellefonte, Pa., $6,159; South Shore Construction Co., Erie, Pa., $5,-361.28; Ryan Bros., Russell, Warren Co., Pa., $8,084.50; Wm. C. Evans, Ambler, Pa., $6,831.80.

On brick block road in Mill Creek Twp., Erie Co., extending from northeastern line of the city of Erie to the southwestern line of Boro. of Wesleyville, distance of about ¾ mile, two types of bids were received, type A being for a road 26 ft. wide and type B for one 18 ft. wide. On bids of this kind it is understood, of course, that State Highway Department stands only cost of one-half of standard width. Where extra wide highways are built on State-aid applications the excessive cost is borne in full by the applying county, township or borough. The following bids were received: Wm. C. Evans, Ambler, Pa., (Type A) $61,438.70, (Type B) $37,955; Duster Contracting Co., Tarentum, Pa., (A) $84,681.27, (B) $59,366.47; National Supply & Const. Co., Ellwood City, Pa., (A) $60,000, (B) $35,143; O. M. Severson & Co., Erie, Pa., (A) $57,303.19, (B) $36,158.41; R. H. Cunningham & Son, Turtle Creek, Pa., (A) $73,335.75, (B) $44,471.52; South Shore Construction Co., Erie, Pa., (A) $69,347.85, (B) $41,566.22; Mayer Bros. Construction Co., Erie, Pa., (A) $60,747.70, (B) $36,527.85; Hassam Paving Co., Worcester, Mass., (A) $60,-490.45, (B) $37,490.51; J. & M. Doyle, Erie, Pa., (A) $58,981.55, (B) $35,511.05; Lawrence Schultz, Fredonia, N. Y., (A) $68,-992.50, (B) $38,905.53. L. Vincent Metz bid on both Type A and B, but neglected to total his bids.

Bids have also been received on proposals for removal of 9,000 cu. yds., more or less, of material from the bed of Turtle Creek at or near point where Thompson's Run empties into Turtle Creek. First proposal was for material to be removed to property designated by State Highway Commissioner in vicinity of Turtle Creek Station. Second was for material to be moved from entirely without limits of banks of Turtle Creek. Bids received were as follows: R. H. Cunningham & Son, Turtle Creek, Pa., 1st proposal, per cu. yd., $1.49, 2d proposal, per cu. yd., $1.65; A. V. Purnell, Pittsburgh, Pa., (1) $1.35, (2) $2; E. M. Wichert, Pittsburgh, Pa., (1) 75 cts., (2) 75 cts.

Mt. Union, Pa.—For paving Shirley and Jefferson Sts. with brick on concrete to Gregory Paving Co., Lewiston, Pa., at $13,000. Geo. W. Morgan is Boro. Secy.

Speers, Pa.—By Borough Council to Parson's Construction Co., Brownsville, Pa., at $3,200.88 for paving State St.

Seattle, Wash.—By Board of Public Works for concrete walks on Brandon St. to B. H. Petley at $1,228.90.

Wilkes-Barre, Pa.—Contract for brick paving has been awarded to Herrick Construction Co.

Tenn., Loudon.—By Loudon County, to Oliver & Hill, of Maryville, at about $50,000, to construct roads, including Loudon County link of Memphis-to-Bristol highway.

Houston, Tex.—By city, to Eureka Paving Co., Carter Building, Houston, to pave Crawford St., from McGowen to Holman St., with asphaltic concrete. E. E. Sands is City Engr.

Gate City, Va.—For grading about 45 miles of road in Scott County to Oliver & Hill, Gate City; appropriation $71,000. G. P. Coleman is State Highway Comr., Richmond.

Seattle, Wash.—Bids have been opened as per advertised call for construction of Issaquah-Fall City road, and contract awarded to P. J. McHugh, at $65,284.13, being lowest bidder. Bids were opened for construction of W. D. Perkins road (bond issue No. 30) and contract awarded to Reinseth Bros., at $11,130.50, they being lowest bidders.

Madison, Wis.—By State Highway Comn., Madison, to R. R. Bullard, Amy, Wis., for following grading and surfacing on State Highway, in Dunne Co., about 9,000 ft., 9 ft. wide, with shale macadam: excav., 25 cts.; culverts (reinforced), $6.50 per cu. yd.; surfacing 26.5 cts., and 22.5 cts. per cu. yd.

SEWERAGE

Birmingham, Ala.—Board of Revenue has formally accepted specifications of improvement contemplated at sewerage disposal plant near Bessemer as submitted by L. H. Salter, sanitary engineer, and ordered them properly recorded. These specifications are ones that were submitted to several contractors, which resulted in contract being awarded to Southern Asphalt & Construction Co.

Fort Smith, Ark.—I. H. Nakdimen, president of City National Bank, has purchased between $9,000 and $10,000 worth of Crawford Co. improvement district bonds. Bonds are issued by Van Buren storm sewer improvement district. J. J. Izard is chairman of Board of Commissioners. A storm sewer, with laterals leading off to side streets, is to be constructed on Broadway, one of main residence streets of that city. It will cost about $10,000 and will require about six months' time to complete the drainage system.

Orland, Cal.—Orland City Trustees have ordered city engineer to prepare plans and specifications for extension of Orland's sewer and water system.

Riverside, Cal.—Bids have been invited for construction of drainage conduits in portions of Almond and Market Sts., along course of lower land of Riverside Water Co., and in 12th St. Canal, connecting upper and lower canals Estimated cost, $30,000.

Bridgeport, Conn.—At least $40,000 of sewer bond issue of $300,000 will be purchased by sinking fund of city some time in January. It is probable that remaining issue will be disposed of to firm of Hincks Bros. & Co. to the amount of about $260,000. Over $100,000 of this bond issue has already been expended for sewers, but remaining sum will be used toward defraying expenses of trunk sewer to be laid by court order on west side of Pequonnock River, and for other work to be done next spring.

New Britain, Conn.—Board of Public Works will spend $10,000 for completion and repair of sewer system. William A. Hall is City Engr.

Miami, Fla.—City Council has let contracts for laying 25 miles of sewer pipe, 18 miles of which will be laid at once.

Tampa, Fla.—Board of Public Works has opened bids for completion of two sections of the Hyde Park sewer. Two bids were received by board—from G. P. Sullivan, whose bid was divided, and J. P. O'Neill, who bid $104,977.60 for the job.

Augusta, Ga.—Ordinance has been passed for construction of sewers in various streets.

Council Bluffs, Ia.—Matter of providing relief for connecting lines to Sixth Ave. sewer overflow into Indian Creek has been brought up and city engineer recommended that one block of 20-in. sewer be laid to connect line with new main on Sixth Ave.

Council Bluffs, Ia.—Sewer on Second Ave., between 28th and 31st Sts., designed to accommodate number of property owners as well as Detroit Soda Products factory, has been ordered by resolution of necessity.

Dubuque, Ia.—City will construct 8-in. tile pipe sanitary sewer in Valeria St. Work consists of about 454 lin. ft. and 1 manhole. J. J. Shea is Recorder.

Fort Scott, Kan.—Specifications and plans for septic sewerage disposal plant have been finally finished by Worley & Black, of Kansas City, and presented. Mr. Tallman will advertise soon for bids, time limit being 1 o'clock p. m., Oct. 20.

Georgetown, Ky.—City proposes to issue $20,000 of sewer bonds.

Baltimore, Md.—Citizens will vote in November on loan ordinance of $3,000,000 for completion of sewerage system.

Lawrence, Mass.—Municipal Council has voted to borrow $20,000 to complete Pawtucketville sewer.

River Rouge, Mich.—See "Water Supply."

River Rouge, Mich.—Citizens are voting on question of bonding village for $34,500 for improving present sewer and water system.

Audubon, N. J.—Tunnel under Atlantic City Ry. tracks above Orston Station will be built to place last link in Audubon's $150,000 sewer system. Permits for connection of 800 laterals already have been issued.

Camden, N. J.—Ordinace has been passed authorizing construction of sewers, culverts or drains in and along Stevens St., from 27th St. to 30th St.; Pine St., from Walnut St. east: Fourth St., from Taylor Ave. north; Division St., from Newton Ave. to W. J. & S. S. R. R.; Ninth St., from Chelton Ave. to Bulson St.

Manasquan, N. J.—See "miscellaneous."

Plainfield, N. J.—The Joint Sewer Commission has received bids for construction of trunk sewer to Darling farm and for disposal beds to be used in connection with sewer system.

Woodbridge, N. J.—Resolution has been passed authorizing issue of two bonds of $500 each for construction of Grove St. sewer.

Auburn, N. Y.—State Conservation Commission has notified Council it had approved petition for sewers in Elizabeth and Van Anden Sts., emptying into Owasco outlet, and in North and York Sts., emptying into Throopsville Brook.

Brooklyn, N. Y.—See "Streets and Roads."

Kingston, N. Y.—Petition has been received from property owners on Fair St. between John and N. Front Sts. asking for storm water sewer in that block. Also ordinance has been carried that city engineer prepare ordinance and plans and specifications for sewer in Washington Ave. from Warren St.

Niagara Falls, N. Y.—City Engineer Parkhurst recommends new sewers in North Main and Fall Sts.

Rome, N. Y.—Propositions of Messrs. Hering & Gregory, of New York, and C. W. Knight & Son, of Rome, for engineering in connection with sewage disposal plant, which proposition was given in detail in Sentinel on Saturday, has been accepted.

Rome, N. Y.—At meeting of Board of Water and Sewer Commissioners sewer extensions were ordered distance of 400 ft. on Pine St.; also 150 ft. on Clark St. south from W. Dominick St.

Schenectady, N. Y.—Board of Contract & Supply has authorized reception of bids for construction of sewers in newly annexed district.

Syracuse, N. Y.—Ordinances have been adopted ordering a 15-in. sewer in Bellevue Ave. from present sewer to Kandace St., ordering 12-in. sewer in Crescent Ave., declaring intention to pave Crossett St. from Beverley Rd. to S. Geddes St., requesting intercepting sewer board to place valves on sewer in Tallman and Oxford Sts. to prevent back flow, ordering a 12-in. sewer in Lancaster Ave., ordering that Tennyson St. be renumbered, and authorizing a temporary loan of $200,000 in anticipation of collection of 1914 taxes.

White Plains, N. Y.—See "Miscellaneous."

Huron, O.—Sewer bonds in sum of $1,100 will probably be sold to Berlin Heights Banking Co., which submitted only bid.

Youngstown, O.—County Commissioners are about to advertise issue of $46,000 in bonds to pay cost of Pleasant Grove sewer and disposal plant, which has been approved by State Board of Health. Initial system will take care of Pleasant Grove and portion of surrounding territory, with disposal plant near Shields bridge over Mill Creek. As additional territory in Boardman Township is built up, it will be connected with system, ultimate plan being to drain about 3,000 acres, or nearly half of township.

Ambridge, Pa.—To eliminate flood dangers in certain parts of town may necessitate expenditure of at least $10,000 in construction of a large storm sewer. Necessity for this sewer was emphasized by Engineer James P. Leaf, of Rochester, who recommended construction of sewer as solution of situation, and said that it would cost in neighborhood of $10,000.

Erie, Pa.—Ordinance providing for construction of 9-in. diameter lateral tile sanitary sewer in Railroad St., in City of Erie, Pa., extending from 23d St. southeast 800 ft. more or less, together with necessary house connections, has been passed.

Kittanning, Pa.—A delegation from Maple Ave. has requested that sewer be constructed between Water and Jefferson Sts.

South Bethlehem, Pa.—Plans for construction of sewer on Locust St. have been adopted and two bids for contract were received. Bids were from S. W. Chiles and Thomas B. Briody. Action was deferred.

South Bethlehem, Pa.—Superintendent of streets has been instructed to have plans and specifications prepared by city engineer and to secure bids to be submitted at next regular meeting for construction of a sewer inlet at Seventh and Oak Sts.

South Bethlehem, Pa.—Ordinance providing for extension of house sewers on Bishopthorpe and Mechanic Sts. has passed first reading.

York, Pa.—City planning commission are considering city engineer's plans for widening and straightening of Codorus Creek, in Small's Meadow, in connection with construction of new sanitary outfall sewer. As plans are incomplete, no action was taken.

Providence, R. I.—City Council has recommended construction of sewers in various streets. Walter F. Slade is Chief Engr.

Sisseton, S. D.—At special election to be held proposition of issuing bonds in sum of $40,000 for construction of sewerage system will be submitted to voters.

North Chattanooga, Tenn.—Plan is being considered for construction of sanitary sewerage system in large section of North Chattanooga.

Burlington, Vt.—Street Department has been authorized to lay sewer to point 450 ft. south of present terminus on S. Prospect St. A sewer was ordered built in Proctor Pl. to connect with trunk sewer.

CONTRACTS AWARDED.

Bessemer, Ala.—By Jefferson County Board of Revenue, to Southern Asphalt Construction Co., Birmingham, at $76,-[illegible].90, to construct filter beds at sewerage disposal plant near Bessemer. L. H. Slater is Sanitary Engr., room 118, Court House, Birmingham.

Argenta, Ark.—For constructing storm and sanitary sewer system in Sewer Improvement District No. 1, to Gass & Overton, Houston, Tex., at $275,245.

Los Angeles, Cal.—For construction of sanitary sewer in Moneta Ave., from Manchester to Florence Aves., by Bd. of Pub. Wks., to Blas Zaich, at $11,925.

Sacramento, Cal.—The City Commission has let contract to J. W. Terrill, of Chico, for construction of new outfall sewer at cost of about $25,000.

San Francisco, Cal.—Works Board has given Federal Construction Co., Monadnock Bldg., San Francisco, contract to grade and sewer San Bruno Ave.

Savannah, Ga.—By city, contracts totaling $27,447.50 for constructing house drainage and storm sewer system. Contracts as follows: Gadsden Contracting Co., Savannah, and Guild & Co., Chattanooga, Tenn., joint bidders, 6 sections at $390,453.50; A. J. Twiggs & Sons, Augusta, Ga., one section at $136,994.

Savannah, Ga.—For sanitary and storm sewers to Gadsden Construction Co., Savannah, and A. J. Twiggs Co., Augusta, Ga.

Carlyle, Ill.—To D. E. Nipp, Flora, Ill., at $21,325, for construction of sewer, by Local Improvement Board.

Chicago, Ill.—By Board of Local Improvements for tile pipe sewers in various streets with brick manholes and catch basins to Simon Ryan, 2927 W. Congress St.; James M. Corbett & Co., Angelo Santucci, 708 Gilpin Place; Achille Scully, 4892 Lipps Ave.; Theodore Di Vito and George Pontorelli.

East Chicago, Ind.—By Board of Public Works to Thomas Lavene, at $47,266, for 137th St. main sewer.

Lebanon, Ind.—By Commissioners of Boone County to National Drain Tile Co., at $1,069, for ditch in Perry Township.

Dubuque, Ia.—Following contracts have been awarded: Sewer in Mt. Loretta Ave. to Oliver Kringle, Elkader, Ia.; sewer in Dodge St. to C. B. McNamara Co., and sewer in 24th St. to James St.

Detroit, Mich.—By Dept. Pub. Wks. to J. A. Mercier, Hammond Bldg., for construction of Alter Rd. public sewer, at $15,394.

Columbus, Neb.—To Offerman Construction Co., South Omaha, Neb., at $21,892, for construction of concrete and brick sewer, as follows: 3,400 ft. reinforced concrete, 7½ by 4 ft.; 364 ft. 2-ring brick, 64-in. diameter; 600 ft. 10-in. inlet pipe; 16 manholes and 16 catchbasins.

Linden, N. J.—Sewer Committee has reported that contract for construction of lateral sewer in Wood Ave. has been awarded to T. Foster Callahan, and Hussah St. sewer to Matthew Wade.

Binghamton, N. Y.—For construction of sewer along Chenango River on Wall St. to George Pignatello, at $1,489.

Schenectady, N. Y.—The Morris Machine Works, Baldwinville, N. Y., has been given contract for three pumps to be used in avoiding flood conditions at sewage disposal plant, as it was only bid submitted. Figures are: two pumps at $1,460 each and one pump at $1,180.

Cincinnati, O.—To Thurber & Co., Andrews Bldg., Cincinnati, O., at $163,590.50, for section 3, Mill Creek sewer, Mitchell Ave. to Dana St. Frank G. Krug is City Engr.

Enid, Okla.—Contract for sewers in District No. 59, to Wm. F. Black, at $1,016.36. B. F. Lewis is City Engr.

Lebanon, Pa.—Councilman James E. Fisher with E. H. Shroff, superintendent of water department, and James D. Kerr, secretary of board, has awarded contract for Campbelltown Road sewer pipe to Donaldson Iron Co., Emaus, Pa., lowest responsible bidders.

Montoursville, Pa.—To John C. Schrade, Inc., 2132 Beverly Road, Brooklyn, N. Y., for storm sewer in Broad St.; about one mile of 30-in. segmental blocks and 24, 18, 15 and 12-in. vitr. pipe, manholes and catch basins. S. D. Neyhard is Engr.

Galveston, Tex.—Contract for construction of what will be known as 37th St. drain has been awarded to Freund & Quay, Galveston, on recommendations of Commissioner Sappington. Concrete drain will be built between Strand and Church Sts. at cost of about $13,000. Drain will extend to the south side of Church St. and will connect with drain terminating at present at Strand.

San Antonio, Tex.—For construction of 3 sewers to E. G. Truehart & Co., at $20,905, $11,781 and $30,255, respectively.

Richmond, Va.—For construction of sewers, by Administration Board to Nicholas & Henly and Scott-Nuekols Co., at $7,470 and $23,411 respectively.

Richmond, Va.—For sewers as follows: Terra cotta pipe sewers to Nicholas & Henley, $19,387.84; brick and pipe sewers and terra cotta pipe sewers to Scott-Nuckols Co., Inc., $43,650 and $950, respectively, Chas. E. Bolling is City Engr.

Williamson, W. Va.—By city, to Pietro Paving & Construction Co., Morgantown, at $19,000, to construct sewers.

Puyallup, Wash.—Contract for installing drain on 13th St. S. E. has been awarded to Ed. McKim.

Niagara Falls, Ont., Can.—City Council has accepted bid of Manley & Ferris on four short sections of sewer work at $2,500.

WATER SUPPLY

Orland, Cal.—See "Sewerage."

Red Bluff, Cal.—Fred McDowell, who has charge of circulation of petition which asks that City Trustees set date when people of this city will be called upon to vote bonds in sum of $85,000 to establish a municipal water system, states that over 300 signatures have been attached to proposition.

Bridgeport, Conn.—The Bridgeport Hydraulic Co. has petitioned Board of Aldermen for permission to lay a 16-in. pipe across Berkshire bridge in order that people living in that section of East Side might be given more adequate water supply.

Lakeland, Fla.—See Miscellaneous.

Waukegan, Ill.—Erection of small standpipes every two or three blocks apart in city is being considered.

Bloomington, Ind.—E. M. Campbell Sons & Co., of Indianapolis, were highest bidders on $15,000 of municipal water works bonds.

Bloomington, Ind.—City of Bloomington, by its Mayor and Council, has been ordered to prepare at its "earliest convenience" to construct pipe line from White River to Bloomington in order to prevent future water famines in university town and to insure adequate and good supply of water.

Fort Wayne, Ind.—City engineering department estimates that it will cost approximately $11,000 to construct concrete dike along east bank of St. Joe River from Lake Ave. to Forest Ave. Flood gate will be set into this dike at Romy Ave., which thoroughfare will be kept open except during periods of excessively high river levels. An earthen dike will be constructed from Forest Ave. to State St. bridge.

Winterset, Ia.—City is considering improvements to water works system, to include new source of supply and extensions. Harper & Stiles are consulting engineers, of Grand Ave. Temple, Kansas City, Mo.

Winchester, Ky.—Effort will be made by Council to call election in November to vote on water question.

Methuen, Mass.—Town will vote to lay 300 ft. of water main along Orchard St. from Cypress Ave. to Plymouth St., then along Plymouth St. a distance of about 300 ft. and appropriate $600; also to lay 750 ft. of water main along Comet Road and appropriate $750 for same.

Pittsfield, Mass.—It has been voted to lay 400 ft. of water mains in Deming St. and 300 ft. of water mains in Belvidere Ave.

Benton Harbor, Mich.—Benton Harbor will vote on $60,000 water works improvement issue at November election. Common Council of that city has voted to submit proposition to voters. The money will be used for making needed water works extensions. An auxiliary main system will be installed in business section.

River Rouge, Mich.—Citizens are voting on $34,500 bond issue for improving water and sewer system.

River Rouge, Mich.—By decisive vote of 165 yeas and nays, on water question, and 158 yeas and 12 nays on sewerage question, citizens of River Rouge have authorized bonding of village for $34,500 for purpose of improving present water and sewer systems.

St. Paul, Minn.—Water mains have been ordered laid by Water Board along Como Blvd. from Acorn St. to Osage St.; Maryland St., from Como to Langtry Ave.; Sargent St., from Hamline to Syndicate Ave.; Plum St., from Maria to Bates Ave., and on Portland Ave., from Hamline to Albert Ave.

Billings, Mont.—Board of Health is considering installation of modern filtration plant in connection with water system to cost $135,000.

Hagerman, N. M.—Town Trustees are developing water supply for proposed water works system. Bonds in sum of $16,000 have been voted for this purpose.

Asbury Park, N. J.—Sinking Fund Commission will purchase $50,000 water bonds.

Branchville, N. J.—Borough Council has voted to advertise for bids for 6 and 8-in. iron pipe to replace wooden water pipe in Wantage Ave. Bids are to be opened Nov. 4 and date for delivery of pipe is set for Nov. 10.

Manasquan, N. J.—See "Miscellaneous."

New Brunswick, N. J.—In effort to meet present situation in water drought question, and to also provide for further emergencies, Board of Water Commissioners has engaged Asher Atkinson, a well known engineer, of this city, to prepare plans for development and enlargement of New Brunswick water shed. First suggestion already advanced, since consulting engineer was appointed is that dam at Weston's mills be raised 3 ft. in height, thus giving city additional water storage of about 75,000,000 gallons.

New Brunswick, N. J.—Water Board is considering installation of filtration plant and raising of Weston's Mill dam.

Lestershire, N. Y.—Bids for $10,00 bonding issue of Lestershire water works have been opened. The First National Bank of this place was successful bidder.

Newburgh, N. Y.—At cost of approximately $1,500, board will lay water mains through South St. as far as South Plank Rd. as soon as possible.

Newburgh, N. Y.—Talk of supplying water to all those using connections larger than ¾-in. pipe or household size on meter basis has been revived by Board of Water Commissioners, and as a result action was taken looking to opinion from Corporation Council on right of board to install water meters and charge cost against consumers.

Lancaster, Pa.—J. W. Ledoux, consulting engineer, has recommended that water plant should be enlarged, and new machinery installed.

Philadelphia, Pa.—Increasing pumping facilities will be provided for Torresdale and Wentz farm. Pumps now at filtration plant will be utilized to wash sand in cleaning of preliminary filters. Those at Wentz farm reservoir will provide increased pumpage pressure at Lawndale to maintain supply for Somerton and Byberry. Alterations in pumping equipment will be possible now that use of water has decreased with passing of hot weather. Bids received included general supply of materials and equipment, costing $50,000.

Punxsutawney, Pa.—In special session Council has discussed water question and has instructed Borough Solicitor William Gillespie to prepare bond issue not exceeding $200,000 in small denominations. He was also instructed to draw up ordinance under which municipal water plant might be established in Punxsutawney and to present ordinance at next meeting of Council.

Summit, S. D.—J. B. Sullivan, a civil engineer of Huron, has visited Summit at request of Town Council for purpose of looking over plans for proposed system of water works. He will report on proposition later, and in meantime Council will advertise for bids to ascertain what system will cost.

Knoxville, Tenn.—Expert engineer, Dabney H. Maury, after several days' investigation of water plant, has submitted report to city commission, in which he recommended extensive changes in plant, total cost of which would amount to about $500,000.

Lynchburg, Va.—See "Lighting and Power."

Seattle, Wash.—Plans have been received from engineer for curbs and water mains on 31st Ave., at cost of $13,000.

Sheboygan Falls, Wis.—Common Council is considering bond issue for construction of municipal water system and sewage system.

Vancouver, B. C.—West Vancouver, one of the many suburbs of this city, is planning to install new water system. A concrete dam 100 ft. long and 26 ft. high, capable of holding 1,100,000 gallons of water, will be constructed at cost of $15,800. System will include 18 miles of lap-weld steel pipe, 2,000 of which will be 12-inch and an equal length 10 and 8 inch. Lateral pipes will be of 4 and 6-inch steel, and provision has been made for erection of 65 hydrants for fire-protection purposes. Estimated cost of system is $120,000.

CONTRACTS AWARDED.

Tuscaloosa, Ala.—By city, to Pitt Construction Co., Pittsburgh, Pa., to build reservoir on Castle Hill at cost of about $28,000.

Grand Mound, Ia.—To Des Moines Bridge & Iron Co., for 90 ft. steel tower and tank, 50,000 gallons, brick or concrete pumping station, deep well pump and 400 ft. 8-in. cast-iron water mains at $5,615. C. P. Chase is Engineer, Clinton, Ia.

Stanton, Ia.—For construction of water works system, to E. J. Heckle, of Kansas City, Mo., at $10,465.09, for oil engine drive. Will use Smith-Vaile pump, Ingeco oil engine, Des Moines Bridge & Iron Works steel tank and tower. Theo. S. De Lag, Creston, Ia., is engineer.

Augusta, Me.—Contract for construction of filter plant has been awarded to James H. Ferguson, Dorchester, Mass., for approximate amount of $47,000. Prices are upon unit plan and are as follows: Coffer dam and protection work, $1,500; 7,730 cu. yds. of earth excavation at 58 cts. per cu. yd.; 900 yds. of rock excavation at $2.25 per cu. yd.; 955 cu. yds. of concrete in floors at $7.25 per cu. yd.; 1,280 cu. yds. of concrete in walls at $7.25 per cu. yd.; 85 cu. yds. of concrete in piers at $7.25 per cu. yd.; 70 cu. yds. of concrete in roof at $7.25 per cu. yd.; 27,300 sq. ft. of arch center at 10 cts. per sq. ft.; 30 tons of cast iron pipe, 6 in. to 18 in., at $60 per ton; 11 tons of special and flanged pipe at $100 per ton; 220 cu. yds. of filter gravel at $2 per cu. yd.; 2,400 cu. yds. of filter sand at $1.75 per cu. yd.; entrance and operating chamber, $1,200; 1,500 lbs. of reinforced material at 4 cts. per lb.; 375 ft. of 12-in. and 50 ft. of 4-in. tile at 90 cts. per lin. ft.; 150 cu. yds. of concrete river wall at $7.80 per cu. yd.; 1 acre of seeding at 20 cts. per sq. rod; gate valves, $841; controller and regulating valves, etc., $1,300; structural work, $400; interior tile drainage and roof tiles, $510. Work upon plant will be commenced as soon as possible.

Groveland, Mass.—For installation of water system to Hanscom Constr. Co., Boston, at $40,000.

McComb City, Mich.—By city, to Sloder & Winnerland, McComb City, for construction of concrete reservoir of 700,000 gals. capacity. Cost $8,000. Xavier A. Kramer is engineer, Magnolia, Miss.

Atlantic City, N. J.—By Board of Commissioners for increasing impounding area of Lower Doughety Pond to E. L. Bader Co., Atlantic City, at $71,891. Itemized bids as follows: 30,000 cu. yds. embankment at 40 cts.; 24,100 sq. ft. steel sheet piling, 80 cts.; 20 cu. yds. cement grout, $20; 24,100 lin. ft. wood stripping, 1 ct.; 1,577 yds. concrete in spillway, $9; 1,000 lbs. reinforcing steel, 5 cts.; 59 expansion bolts, each $4; 15 yds. concrete in wood stave collar, $30; 2,575 yds. concrete in core wall, $6.35; 13 M. ft. lumber, 5 cts.; bridge from bank to intake (lump sum), $175; 3,800 lin. ft. piling spillway foundation, 25 cts.; 9 M. ft. spillway foundation, 4 cts.; 36,000 sq. ft. concrete lining, 13 cts.; new intake screen chamber (lump sum), $1,000; 100 yds. concrete not in plans, $6; 100 yds. excav. not in plans, 50 cts.; 500 lbs. steel rods not in plans, 5 cts. Other bidders were: Wm. H. Arthur Co., $75,585; C. T. Eastburn, Philadelphia, $78,578, and Merrill Ruckgaber Co., New York, $80,369.

Riverton, Minn.—By Village Council to Pollock Bros., for public water works system.

Trenton, N. J.—The State Water Supply Commission has given its approval of contract between Borough of Totowa and Passaic Water Company for supply of water to borough. According to contract the water company will supply water at $100 per million gallons, plus all charges made by State for diversion of waters required for this supply. Pumping station will be located at Little Falls, Passaic County.

Riverhead, L. I., N. Y.—Water Commissioners for Riverhead, who are to supervise construction of new municipal water plant here, have tendered principal part of contract to Lincoln-Steele Flemming Co., of Manhattan, for $65,668. For that sum company will lay mains, provide and install 105 fire hydrants, erect tower and tank and perform other services. Erection of building will be let to a Mr. Kruge, living in Mineola. His contract price will be $8,270. The filters to be installed will also be included in separate contract. These will cost $4,600. In addition to above sum village district will pay Riverhead Water Co. $10,000 for its business and such of its equipment as can be used. And still in addition village will pay about $7,250 as fees for engineer in charge, W. E. Sexton; the attorney for village, Nathan O. Petty, and in acquiring about 1½ acres of land in western part of village, on which will be erected pumping station, wells, tower and tank and other apparatus necessary. Total cost is to be about $95,138.

Dayton, O.—Contracts have been awarded for meter parts for repair of Worthington and Pittsburg meters. Contract with H. R. Worthington Co., 115 Broadway, New York, involved $1,909.75 and with Pittsburg Meter Co., $764.

Mitchell, S. D.—To Ward & Weighton, of Sioux City, Ia., for water mains in different parts of city at about $6,000.

Denison, Tex.—By city, to American Water Softening Co., 10th and Chestnut Sts., Philadelphia, Pa., at $15,034, to install water purifying system. This does not include certain concrete construction, which will be undertaken by city. Total estimated cost, $27,000 to $28,000.

Galveston, Tex.—Contract for furnishing waterworks department with 150 tons of cast iron pipe has been awarded to R. D. Wood & Co., 400 Chestnut St., Philadelphia, their bid being $22.75 per ton.

Salt Lake City, Utah.—Contract for construction of first unit of distribution reservoir to be built on Fort Douglas reservation by Salt Lake was let by City Commission to R. E. Wilson on bid of $35,440.80.

Salt Lake City, Utah.—Bids on construction of first unit of 20,000,000-gallon distribution reservoir to be constructed by city on Fort Douglass reservation have been opened by City Commission and referred to city engineer for tabulation. Bids also were opened for construction of Twin lakes reservoir dam and referred to engineer. Tabulation of distribution reservoir bids had not been completed, but from partial tabulation it appears that R. E. Wilson is lowest, with D. B. Brinton a close second. Other bidders are Green Construction Co., P. J. Moran, Parrott Brothers and the Continental Construction Co. Engineer's estimate is about $75,000. There were only two bidders on the Twin lakes dam, Owen H. Gray and Enoch Smith. Both are higher than the engineer's estimate and both bids may be rejected. Gray's bid was $80,107, and Smith's was $99,000. Engineer's estimate is $70,000.

Seattle, Wash.—By Board of Public Works for three sets of twin steam hoisting apparatus for use at masonry dam to Coldwell-Wilcox Co., Newburgh, N. Y., at $3,900.

Winnipeg, Man.—For constructing 84.72 miles of aqueduct of Shoal Lake water project for Greater Winnipeg Dist., Contracts Nos. 30 to 34, inclusive, following are successful bidders: Contract 30, to J. H. Tremblay Co., Ltd., Winnipeg, $945,945; Contract 31, Thos. Kelly & Sons, Winnipeg, $1,301,485; Contracts 32 and 33, Northern Constr. Co., Winnipeg, $1,268,680 and $1,137,010, respectively; Contract 34, Carter Halls Aldinger, Ltd., Winnipeg, $1,489,520.

LIGHTING AND POWER

Pomona, Cal.—Petitions for installing ornamental light posts throughout business section are being circulated.

South Pasadena, Cal.—City trustees will start proceedings for ornamental lighting of Fair Oaks Ave. City clerk has been authorized to advertise for bids. Lights are to be 400 candlepower, in single large globes on handsome posts, and will be installed on Fair Oaks Ave. from the Pasadena line to Los Angeles line.

Lakeland, Fla.—See Miscellaneous.

Mount Vernon, Ga.—Citizens will vote at November election on question of $50,000 bond issue, proceeds to be used for construction of municipal electric light plant.

South Bend, Ind.—Board of Public Works has decided to use boulevard system of lighting on several streets. Boulevard lights will be placed on Riverside Drive from Portage Ave. to Leeper Hill, then down Leeper Hill through Leeper Park, and on Lafayette St. from Leeper Park to Monroe St. On Lincoln Way west, Vistula Ave., from

Sample St. to city limits, boulevard system of lighting will also be adopted. On Lincoln Way east lights will be set upon concrete posts along east side of street. Boulevard lights will replace arc lights.

Oskaloosa, Ia.—Petition of property owners and occupants along first block of North Market St. for lights of great white way type has been presented by Geo. Cruzen. Petition presented sought to have single light at corners instead of on property line. Council voted that lights should be placed in conformity with plan adopted and carired out in other blocks which new system is being installed.

Leavenworth, Kan.—Estimates of City Engineer on "white way" on Delaware St. have been accepted. There are three different styles of standards provided for in estimates. First class standards, 72 in all, will cost $2,808. Second class will cost $2,160, while those of third class will call for expenditure of $1,512. Cost of installation will be same, no matter what type standards are used, or $3,650.

Lynn, Mass.—Improvements to street lighting system is planned.

Waltham, Mass.—Improvements to lighting system are being discussed. Report on same has been submitted by Prof. Wickenden.

Saginaw, Mich.—Movement by petition to have Council submit plan to bond city to build municipal lighting plant has received considerable impetus. Three petitions asking for bond issue have been received and referred to the Council as a committee.

Duluth, Minn.—Contract for laying gas and water mains in 55th Ave. west between Eighth and Highland Sts., and in Highland St. to 56th alley, and in 62d Ave. west from Raleigh to Redruth Sts., has been awarded to Eklund & Hedberg on their bid of $580.28.

St. Paul, Minn.—Street lighting contracts running from one to three years are being discussed at conference between officers of St. Paul Gas Light Co. and city officials in charge of lighting.

Blair, Neb.—Blair has voted to issue $35,000 bonds for building municipal light plant to be operated in conjunction with water works.

Paterson, N. J.—Plans for municipal light distributing plant are to be submitted to city soon by George F. Murphy, of New York.

Paterson, N. J.—It has been resolved that director be authorized to sign lighting contract with Public Service Corporation, dating from Oct. 1 and extending eight months.

Newburgh, N. Y.—Permission has been granted the Central Hudson Gas & Electric Co. by City Council to construct conduits in Montgomery, South and Grand Sts., Leroy Pl. and Liberty St. so that it may place its high tension wires leading from sub-station in Balmville to power plant at Montgomery and Third Sts. under ground. Council also ordered company to construct conduits in Montgomery St. from 3d St. N. to city line and to bury all overhead wires in that street on or before October 1, 1915.

Port Jervis, N. Y.—At special meeting of Fowler Hose Co. No. 3 it was voted to buy new automobile truck. Truck will cost $4,500. It is being made by Philadelphia & Reading Engine Co., of Philadelphia, Pa.

Sandusky, O.—Plans are still being considered to further proposed "white way" in business section of city.

Yoncalla, Ore.—Special election will be held in December for voting on question of bond issue, proceeds to be used for construction of electric light system.

New Castle, Pa.—Within next few weeks 30 new street lights, 20 arcs and 10 incandescents will be erected in city.

Philadelphia, Pa.—Improvement of lighting facilities on Haverford Ave. is asked.

Williamsport, Pa.—In committee of whole Council decided to readvertise for gas lighting.

Summit, S. D.—Installation of electric light plant is being considered.

Wessington, S. D.—Plans are being made to install electric light plant.

Westminster, S. C.—Bond issue of $16,000 has been voted for construction of municipal electric light plant.

Lynchburg, Va.—E. C. Wiley, consulting engineer, has prepared plans and submitted same to City Council for a municipal electric light plant. Estimated cost, $150,000.

Lynchburg, Va.—Council Committee on Water has decided to recommend plans already adopted for proposed municipal electric light plant and auxiliary water supply plant to City Council at next meeting of that body.

Niagara Falls, Ont., Can.—Plan of Alderman Ward for decorative street lighting systems at south, center and north end will be carried out this year. Estimated cost of decorative systems is $10,200. Nitrogen lamp will be used throughout entire system.

Windsor, Ont., Can.—Wooden poles and overhead wires will be installed on Sandwich St. west, Windsor, unless property owners present petition for ornamental lighting standards.

CONTRACTS AWARDED.

Downs, Kan.—After years of waiting Downs is to have lights on side streets. Contract between city and light company has been closed and lights are to be installed in next 60 days. Contract calls for 60 75-watt lamps at various intersections of entire city, price to be $1 per lamp per month. In contract city is obligated to furnish about $200 worth of equipment and company builds the lines.

Niagara Falls, N. Y.—By Board of Public Works, contracts for extension of decorative lighting system in 3d and Main Sts. The General Electric Co. got the contract for electrical end of job at its low bid of about $10,000 and the Electric Railway Equipment Co. will furnish the poles, arms, etc., for $5,470. Total is considerable below original estimate of $20,000.

FIRE EQUIPMENT

Kokomo, Ind.—Fire Chief E. Shauman recommends that fire stations be equipped with motor apparatus.

Shelbyville, Ind.—Purchase of 1,000 ft. of fire hose has been postponed.

Dubuque, Ia.—Motor pumping engines in nearby cities are being inspected prior to making a purchase for this city for which appropriation of $10,000 has been allowed.

Methuen, Mass.—By request of Board of Fire Engineers, town will vote on action to appropriate sum of $1,000 for repairs on fire station and fire apparatus, money to be expended under direction of fire engineers.

Kalamazoo, Mich.—Additional fire protection is urged.

New Haven, Mich.—Installation of proper fire-fighting facilities is being considered.

Milan, Minn.—The Milan Fire Co. may purchase a chemical engine.

St. Paul, Minn.—Bids are being received for 5,000 ft. 2½-in. pumping fire engine rubber hose, 4-ply with 5-ply caped ends.

Riverside, N. J.—Firemen have petitioned Township Committee for appropriation for installation of alarm system.

Spring Lake, N. J.—Spring Lake people will vote on projected bond issue of $10,000 for new fire apparatus at special election Nov. 11, instead of at regular election.

Westville, N. J.—Erection of new station and purchase of up-to-date apparatus is under consideration by Union Fire Co.

Binghamton, N. Y.—A three-way or two-way combination truck will be purchased for Central station. This will be a motor apparatus with pumping engine carrying hose or pumping engine carrying hose and chemical.

Ithaca, N. Y.—With approval of Common Council of proposition to provide motor truck for department it is probable that Fire Company No. 4 will commence at once to lay plans for placing its equipment, recently acquired, in operation.

Newburgh, N. Y.—Members of Leonard Steamer Co. are awaiting favorable opportunity to ask city for automobile fire engine. Idea of members is to combine hose-carrying apparatus in motor fire engine, so that one-horse apparatus may be dispensed with.

Rochester, N. Y.—Board of Contract and Supply will advertise for bids for 50-gallon chemical tank. Charles Little is Chief.

Wampsville, N. Y.—Plans are being made by newly organized company to buy chemical engine. Address F. E. Webster.

White Plains, N. Y.—See "Miscellaneous."

Jud, N. D.—Village has voted on question of purchasing fire equipment and erection of station.

Lebanon, Pa.—Installation of fire alarm system is advocated.

New Castle, Pa.—Purchase of motor aerial truck, one motor triple combination wagon and 5,000 ft. of hose is recommended by National Board of Fire Underwriters. Frank J. Connery is Chief.

Philadelphia, Pa.—Better fire protection is asked for in area bounded by 44th and 63d Sts. and Market St. and City Line.

Lakeland, Tex.—See Miscellaneous.

Martins Ferry, W. Va.—Repairs will be made to fire alarm system.

Madison, Wis.—Chief C. W. Heyl has recommended to Finance Committee purchase of motor combination chemical and hose wagon, and tractors for aerial truck and steamer.

Waukesha, Wis.—City may purchase a motor combination chemical hose and ladder truck for Fire Department.

Moncton, N. B.—City is considering purchase of additional motor apparatus in near future. George Ackerman is Chief.

CONTRACTS AWARDED.

Beverly, Mass.—Committee on Public Service and Aid has awarded contract on combination fire kit for the Central Fire station. Appropriation calls for $5,500. Price named in contract, which was awarded to Kress Co. of Lawrence, is $5,640.

Sedalia, Mo.—To Dayton Rubber Mfg. Co., Dayton, O., contract for furnishing their Dayton Airless Tires.

Freeport, N. Y.—To Empire Rubber & Tire Co., Trenton, N. J., contract for 500 ft. of hose.

Goshen, N. Y.—It has been resolved to purchase fire truck from American-La France Fire Engine Co., of Elmira, N. Y.

Mechanicville, N. Y.—Bids and specifications for construction of new motor fire truck to be purchased by W. L. Howland Chemical Co. have been opened Thursday by purchasing committee of company. Contract was awarded to Brockway Motor Truck Co. of Cortland, N. Y. New machine will be equipped with chemical tanks, ladder, axes and other equipment. It will have 50-horsepower motor of latest type, which will develop speed of 50 miles an hour.

Dayton, O.—To Manhattan Rubber Co., Passaic, N. J., for 4,000 ft. of hose.

Meadville, Pa.—Bids for hose supply for city for coming year have been let by City Council on recommendation of Mac. L. Clark, Superintendent of Public Safety, who recommended bid of Eureka Hose Co., at $1 per ft. The council decided to purchase 1,000 ft. of fire hose for coming year, all to be delivered at one time.

Fort Worth, Tex.—To American-La France Fire Engine Co., Elmira, N. Y., for motor pumping engine at $8,250.

Port Arthur, Tex.—By City Commissioners, contract to Star Electric Co., 686 Frelinghuysen Ave., Newark, N. J., for installation of fire alarm system to cost $8,200. Some time back city voted a bond issue of $10,000 to cover this installation.

BRIDGES

Dixon, Cal.—Bids will be opened Oct. 19 for construction of Clausen bridge across Putah Creek, north of Kidwell Ranch, thereby linking State highways of Yolo and Solano Cos. This bridge, of two arch spans each 150 ft. long and 21 ft. above high water, is to be of reinforced concrete, cost $40,000 and be one of best bridges in Superior California.

Susanville, Cal.—Board of Trustees of Susanville are considering proposed concrete bridge across Susan River to Southern Pacific depot and has ordered preparation of plans and specifications at once.

Dover, Del.—Plans have been completed by W. H. Scott, engineer, for construction of 150-ft. span steel bridge for county.

Wilmington, Del.—At meeting of Levy Court, Commissioner Burris presented resolution authorizing employment of expert engineer to act with County Engineer Wilson in preparing plans and estimating cost of new arch bridge at Washington St. over Brandywine.

Richmond, Ind.—Petition is being circulated for bridge on South E St.

Salina, Kan.—County Commissioners have prepared to advertise for bids on construction of number of small cement bridges and culverts in county. Most of them will be on county roads, two being on Meridian line to the northwest.

Caryville, Mass.—At special town meeting it was voted to appropriate $1,600 for purpose of building reinforced concrete bridge at Caryville.

Ecorse, Mich.—Election will be held for voting on question of bonding township for $35,000 for building of new steel lift bridge across creek.

Glendive, Mont.—Although no official action has yet been taken it is understood that Board of County Commissioners will take necessary steps within a few days to cause submission to voters at November election of proposition to bond county in sum of $200,000 for purpose of building bridges over Yellowstone River at Marsh and Intake, and for installing of new span in big bridge which crosses river at this city.

New Brunswick, N. J.—A demand has been made upon Pennsylvania R. R. to erect new bridge over Delaware and Raritan Canal at Kingston. Present bridge, which is one of narrowest in this vicinity, is located at bottom of steep Kingston hill.

Paterson, N. J.—County Engineer Garwood Ferguson has appeared before Board of Freeholders and presented two plans for their consideration, in relation to proposed bridge at Greengood Lake Glens. Plans which Mr. Ferguson seemed to regard as most feasible would entail expenditure by county of $30,000. As announced, it provides for construction of road 16 ft. wide from Charcoal road and improvement of latter.

Glenville, N. Y.—At election on Nov. 3 voters will decide on bond issue for erection of bridge across Mohawk River, called Freeman bridge.

Warren, O.—Actual work has started on plans for West Summit St. bridge across Mahoning River. It was decided that bridge to be erected should be of girder type, and estimated cost will run from $30,000 to $35,000, of which amount County Commissioners under law will pay $18,000, and city of Warren the remainder.

Idabel, Okla.—At special meeting of County Commissioners it was decided to call for election on November 3 for purpose of floating $122,000 bonds for construction of 37 bridges in this county.

Coleman, Tex.—The commissioners' court has let contract for three large bridges to be erected in this county, two west of Coleman and one east of town. Their total costs will be $16,500, to be completed Feb. 1, 1915.

Logan, Utah.—County Commissioners have authorized construction of two new bridges in north end of Cache, one over Spring Creek and other over Cub River.

CONTRACTS AWARDED.

Fowler, Ind.—On extremely close bidding, following bridge contracts have been awarded by Benton County Commissioners: No. 131, Parker & Harreld, Oxford, $369; No. 132, A. E. Gray, Goodland, $489; No. 133, O. B. Anderson, Boswell, $2,489; No. 134, W. W. Evans, Fowler, $2,615; No. 136, Central States Bridge Co., Indianapolis, $1,725; No. 137, W. W. Evans, Fowler, $1,700; No. 138, A. E. Gray, Goodland, $225; No. 139, P. J. Kennedy, Templeton, $284; No. 240, A. E. Gray, Goodland, $275.

New Castle, Ind.—The Burk Construction Co., of this city, has been granted contract for Painter bridge at cost of $1,500, and Allen bridge at cost of $2,990. Both bridges are girder bridges.

Leavenworth, Kan.—Contracts for construction of nineteen bridges and culverts have been let by Board of County Commissioners, total amounting to $13,200. The Leavenworth Bridge Co. and the Missouri Valley Bridge and Iron Works being successful bidders on most of the jobs. Following contracts were awarded: Missouri Valley Bridge & Iron Co.—Worden, No. 183, $813; Van Tuyl, $770; Keck, $1,090; Sisco, $880. H. S. Martin and C. C. Jeffries—Botts culvert, $290. Leavenworth Bridge Co.—Schwagler, No. 103, $671; Kowalski, No. 110, $793; Turkey Creek, No. 259, $917; Schultz Hill culvert, $193; Kopps, No. 137, $744; Mohan, No. 43, $600; Davidson, No. 257, $950; Moses, No. 45, $798; Sully, No. 132, $862; Kane, No. 124, $855; Dodge culvert, $216. Tierney & Hand—Fairholme culvert, $300. Fred Terry & Son—Greenwood, No. 111, $939; Loomis bridge, $533.

Louisa, Ky.—To Virginia Concrete Co., Salem, for building bridge across Big Sandy River, near Louisa. Approximate cost, $125,000.

Detroit, Mich.—By Dept. Pub. Wks. for construction of steel and concrete highway bridge over Michigan Central Railroad at Porter St. to Detroit Bridge & Steel Wks. at $25,920.

Hoboken, N. J.—To C. S. Edwards, at $9,447, for concrete bridge over open cut in Weehawken on line of Hudson Blvd. East, by Board of Boulevard Commissioners.

Jersey City, N. J.—By Boulevard Commissioners of Hudson Co., to C. S. Edwards, 1 Montgomery St., at $9,447, for arch bridge.

Paterson, N. J.—Committee on Roads has recommended that contract for replanking Wesel bridge with creosote planking be awarded to George W. Mead, who was lowest bidder, provided the Bergen Co. board agrees to pay one-half the cost. This was approved.

Syracuse, N. Y.—To Lupfer & Remick, Buffalo, at $40,472, for construction of bascule bridge over Erie Canal at West Genesee St.

Yorkville, N. Y.—By state superintendent of public works, Albany, for bridge over Erie Canal, at Yorkville, to Scott Bros., Rome, N. Y., at $94,528.60. John A. Bensel is state engineer of surverys, Albany.

Cincinnati, O.—By County Comrs. for constructing concrete bridge over Eagle Creek, Colerain Township, to Jas. Radabaugh, Montgomery, at $6,502.

Tiffin, O.—By Commissioners, to W. H. Hopple, contract for repairing Fraver bridge No. 22, Loudon Township, at $384. The Elkhart Bridge & Iron Co. has been awarded contract for Bachman bridge No. 64, Loudon Township, at $509. B. F. Wolford was awarded contract for concrete tile culvert for Link bridge No. 310, Venice Township, at $201.

Memphis, Tenn.—For constructing concrete bridge over Bayou Gayoso at N. 3d St., by Board City Commissioners to A. M. Alexander, at $8,700.

Beeville, Tex.—County Commissioners have awarded contracts for replacement of three bridges washed away and damaged by floods of August. Replacement of three structures will call for expenditure of $13,898. The Corpus Christi St. bridge over the Paesta, located in Beeville, will be overflow concrete structure and will cost $1,950. It will be built by Alamo Construction Co., of San Antonio. Bridge over Aransas Creek, on Beeville-Skidmore Rd., will cost $6,348. It will be built by Austin Bros., of Dallas. Bridge over Aransas Creek, on Skidmore-Corrigan Ranch Rd., will cost $5,600. It will be constructed by El Paso Bridge Co., of El Paso.

Fort Worth, Tex.—The County Commissioners have awarded Trinity Bridge Co. contract for building new Ten-mile bridge at cost of $4,388.60. There were five other bids, the Trinity being the lowest.

Houston, Tex.—To Wm. Bates, Bellaire, at $2,822, for construction of six concrete culverts, concrete bench, creosoted decking and three 24-in. corrugated iron pipes, by County Commissioners.

MISCELLANEOUS

Andalusia, Ala.—Covington County will erect new courthouse.

Huntsville, Ala.—County Commissioners have issued call for special election to be held during next few weeks for purpose of allowing voters of Madison Co. to vote on proposed bond issue of $70,000 of 5 per cent bonds.

Oakdale, Cal.—Oakdale has voted $400,000 bonds by overwhelming majority to complete Oakdale irrigation district cement canals and furnish water to new lands.

San Francisco, Cal.—The unsold Municipal Railway and City Hall bonds are to be offered for sale. Finance Committee of Supervisors has concluded to call for bids Oct. 26. Remaining Municipal Railway bonds amount to $857,500 and City Hall and civic center bonds to $660,000. Municipal Railway bonds must be sold to provide money for building new car barn to house new cars this winter.

Bridgeport, Conn.—Alderman Ralph S. Broderick has introduced resolution which provides for establishment of public comfort station at junction of State St. and Fairfield Ave., and same has been referred to Committee on Miscellaneous Matters.

Washington, D. C.—A firm of machine manufacturers in Europe advises American consular officer that it desires to place order with leading American forge and foundry company for 20-ton steel stamp intended for rock-cutting dredger to be used in port work. Copy of blueprint of stamp in question may be had on application to Bureau of Foreign and Domestic Commerce or its branch offices. Correspondence may be in French. No. 13963, Bureau of Manufactures.

Lakeland, Fla.—Lakeland has voted bonds in the sum of $165,000, $130,000 of which is to be used in enlarging light and water plants and extension of lines; $15,000 for equipping Morrell Memorial Hospital, and $20,000 for improvement and enlargement of the fire department.

Chicago, Ill.—Bids will be received until noon, Oct. 13, for license plates and badges as follows: Class A, 14,869 pairs of japanned tin plates; Class B, 12,977 japanned tin badges; and Class C, 1,400 aluminum plates. Francis D. Connery is City Clerk.

Richmond, Ind.—Plans for transformer house to be erected at municipal plant have been submitted and bids will be advertised for.

Council Bluffs, Ia.—After considerable discussion Council has authorized committee on street lights and street signs to take steps at once to have proper signs erected in vicinity of each school house in city, warning automobiles to run slowly.

Baltimore, Md.—Citizens will vote in November on loan ordinance of $1,500,000 for completing Key Highway, deepening channel and widening St. Paul St.

Boston, Mass.—Construction of breakwater across Old Harbor, at cost of $500,000, is being planned by Mayor Curley. The breakwater will extend, according to the mayor, from "Calf Pasture" to point on Strandway shore, just below Dorchester Heights. It will inclose with shore line 25 acres of land which at present are flats at low tide. This mayor plans to fill in and cover with fresh, clean sand, that will provide beach at least 150 ft. wide.

Fall River, Mass.—Plans of Architect Edward M. Corbett have been accepted for new Central police station.

New Bedford, Mass.—Board has authorized bids on portable air compressor drilling outfit.

North Adams, Mass.—Commissioner of Public Works has been authorized to buy new city scales at cost not to exceed $700, plus amount received for present scales.

Chisholm, Minn.—Citizens of Chisholm will be given chance to vote, Oct. 20, on proposition of whether they wish to bond city in sum of $450,000 to relieve financial situation into which village has fallen.

Keewatin, Minn.—Bonds in sum of $150,000 will be sold.

Maryville, Mo.—Street committee of City Council has been given authority to install street guides within city limits. It is planned to purchase tin signs with an enameled blue background and with name of streets in white. In business section signs will be placed on buildings, while in residence section square timber posts will be installed at corners and sign placed thereon. Improvement will cost between $300 and $400, according to H. L. Raines, a member of street committee.

St. Joseph, Mo.—The two ordinances appropriating $2,000 and $2,500 from new workhouse fund for building of new pesthouse and remodeling of old pesthouse for emergency hospital on city farm have been unanimously passed by Council and signed by Mayor.

Asbury Park, N. J.—Bids on both concrete and wooden piling for new jetties on North Asbury Park beach will be asked by Beach Commission.

Bridgeton, N. J.—Purchase of pulmotor is authorized.

Garwood, N. J.—Garwood Borough Council has passed upon second and final readings ordinances for issuing $9,000 in bonds for erection of borough hall and firehouse and for construction of building on borough lot at South Ave. and Centre St. Bids for same will be received at 8 p. m., Oct. 27.

Manasquan, N. J.—Ordinance has been passed authorizing laying of water and sewer mains and grading and graveling of roadway recently dedicated to boro by Seacoast Realty Co.

Woodbridge, N. J.—Citizens will vote in November on bond issue of $30,000 for erection of new township hall.

Canastota, N. Y.—The question of purchasing stone crusher by town of Lenox will be resubmitted to taxpayers at fall election.

Lockport, N. Y.—Sum of $1,000 in bonds has been authorized by Common Council for rebuilding bridges over Eighteen-Mile Creek at Olcott St.; for reconstructing drain in Orchard St., and for construction of drain on Walnut St. to Eighteen-Mile Creek.

Schenectady, N. Y.—Authority has been given to new jail committee of Board of Supervisors to advertise for bids, which are to be opened at special meeting to be called for establishment in new jail of fumigating room and for covering of boiler and hot-water tanks with asbestos.

White Plains, N. Y.—At coming election following propositions will be voted on: Shall the village of White Plains enter into an agreement with Scarsdale to build a sewer in the southern section

of the village, at a cost estimated at $14,126.20? Shall the village be bonded for $9,000, to pay its share of the cost? Shall the village issue bonds in the amount of $6,000 to pay for extras on Hope Engine Company house, extend the fire alarm system and make improvements to the Independent and Fire Patrol house? Shall the village expend $9,000 for the purchase of an auto fire engine for the South Side Engine Company? Shall the sum of $15,000 be appropriated for the erection of a new fire house for the East Side Hose Company?

Marietta, O.—Ordinance providing money with which to purchase police patrol has been read the third time. It provides fund of $1,500 for an auto patrol.

Portland, Ore.—Dock Board has opened and accepted bids for $50,000 worth of 6 per cent. city improvement bonds. There were 10 bidders. Biggest block went to Henry Teale, who took $25,000 of bonds at $101.57. Other bids accepted were: United States National Bank, $21,500, dated Jan. 1, 1914, at $101.125; Mrs. L. H. Boyd, $400, dated Aug. 1, 1913, at $101.05; R. E. Carpenter, $1,000, dated Oct. 1, 1913, at $101.00; United States National Bank, $2,600, at $100.5625.

Roseburg, Ore.—By majority of more than 3 to 1, voters of Roseburg have authorized issuance of bonds in sum of $500,000 with which to assist in construction of a railroad between Roseburg and Coos Bay.

Butler, Pa.—Police committee has been authorized to prepare plans and specifications for auto police patrol wagon; to advertise for bids for construction of wagon and report after bids are in when Council will decide whether or not to order machine at present time.

South Bethlehem, Pa.—An ordinance appropriating $1,580 to department of parks and public property has passed final reading.

York, Pa.—Plans for straightening of Codorus creek north of city, prepared by City Engineer Warner, were, in accordance with direction of City Council, submitted by City Solicitor John L. Rouse, to State Water Commission at Harrisburg for its approval.

Providence, R. I.—Resolution authorizing Board of Park Commissioners to expend not exceeding $13,000 for erection of new auditorium building and bandstand at Roger Williams Park and not exceeding $1,500 for construction of suitable gateway at Elmwood Ave. entrance to park has been passed by Common Council.

Rock Hill, S. C.—Chairman Creighton of Finance Committee has stated that bids for $50,000 bond issue had been advertised for, bids to be opened on Oct. 15.

Dallas, Tex.—Plans for two comfort stations have been ordered drawn.

Fort Worth, Tex.—New bids on fuel oil for North Side water plants have been opened, showing following offers: Peirce-Fordyce, 68c. a barrel for 15,000 barrels, delivered in a year, and 72c. for 30,000, delivered in two years. Texas Co., 77½c. for 22,500 barrels, in two years. Magnolia, 70c. for one year, and 75c. for two years. Lowest bid was 70c., from the Magnolia, contingent upon the granting of its pipe line franchise, which was granted. Bids were referred to Commissioners Blanke and Grant.

Newport News, Va.—Proposed appropriation of $2,000 with which to motorize police patrol has been sent to Council without recommendation.

Seattle, Wash.—Superintendent J. D. Rose has been given authority to purchase four Uehling carbon dioxide recorders, four dioxide indicating gauges and four recording stack temperature gauges, at $1,682.

CONTRACT AWARDED.

San Francisco, Cal.—Hans Pederson, of Seattle, Wash., has been awarded contract for building Twin Peaks tunnel at $3,475,300.

Coffeyville, Kan.—Contract for building of municipal incineration plant has been awarded to Col. John H. Lea, inventor and builder of Lea incinerator. Plans and specifications adopted by city commission call for a 16-ton plant, to be complete and in perfect operation, the contract price being $4,000.

Chisholm, Minn.—To C. E. Hunter Co., 2208 S. Wabash Ave., Chicago, Ill., for installing McGuire incinerator, 6 tons daily capacity, at $4,650.

Brooklyn, N. Y.—Two Brooklyn Rapid Transit subway contracts have been approved by Public Service Commission. One was awarded by company to Thomas Crimmins Contracting Co. for $197,442.50 and calls for installation of third rail in Fourth Ave. Subway, between Manhattan Bridge and 86th St. Second contract approved was award of New York Municipal Railway Corporation to Terry & Tench Co. of contract for construction of additional tracks on Broadway elevated line between Havemeyer St. and Myrtle Ave. Cost is $321,305.70.

New York City, N. Y.—The Rapid Transit Subway Construction Co., a subsidiary of Interborough, has received from Public Service Commission award for construction of so-called diagonal station at Grand Central, connecting new Lexington Ave. line at 43d St. with old Park Ave. line at 41st St. With this contract went that for building of connection between Grand Central Station and Steinway tunnel, which ends just west of Third Ave. The Rapid Transit Subway Construction Co. bid $3,097,312.50, and next lowest bidder was Degnon Contracting Co., with $3,124,465. Bids were opened for construction of section of Park Pl.-William St. line, running under General Post Office from near junction of West Broadway and Park Pl. to William and Beekman Sts. It will have one local station, at Park Pl. and Church St., with additional entrance in Broadway. According to unofficial figures, lowest bidder was F. L. Cranford, Inc., who bid $1,575,000, while next was Degnon Contracting Company with $1,714,000.

Schenectady, N. Y.—Benns & Vischer Co., city, the only bidder, was given contracts for 12 bob sleighs with ash boxes, to cost $139 each, and 6 garbage wagons, to cost in the aggregate $2,289.90. Bob sleighs have capacity of six each of small garbage dump carts now in use, and wagons, three each.

Syracuse, N. Y.—Merrill-Ruckgaber Co. of 50 Church St., New York, has submitted lowest proposal for completing Onondaga Creek improvement contract of seven bids received by Syracuse Intercepting Sewer Board. Company's proposal is for $153,105, and contract will probably be awarded. John Young, only Syracuse bidder, was second lowest. His proposal was $167,770. Other proposals were by Walsh Construction Co. of Davenport, Ia., $168,755; E. W. Foley Contracting Corp. of New York, $180,103; F. J. Cogan Co., contractors of New York, $181,460; The State Highway Construction Co. of Beacon, $194,496, and Larkin & Sangster of Seneca Falls, $202,535.

Portland, Ore.—Twelve bids for construction of new city barn to be built at 16th and Chapman Sts. have been received by Purchasing Agent Wood and referred to Council for consideration. Proposal of Parker & Banfield of $38,973 was lowest.

Portland, Ore.—Bids for construction of warehouse at municipal dock No. 1 have been opened by board. The lowest offer was for $30,290, from Anton Teller. Bids were taken under advisement and referred to City Attorney for investigation.

Galveston, Tex.—Contract for furnishing fuel oil at pumping station of water works for one year has been awarded to the Magnolia Petroleum Co. at price of 75 cts. per barrel of 42 gallons.

Norfolk, Va.—Upon recommendation of Engineer Dornin board awarded to Standard Oil Co., lowest bidder, contract for furnishing water department with 1,500 gallons of gasoline for use at Hump Back bridge pumping station, price to be 12½c. per gallon.

TOO LATE FOR CLASSIFICATION

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
			STREETS AND ROADS	
Ind.,	Hartford City	2 p.m., Oct. 19.	Stone for repairs	Jas. Cronin, Jr., Blackford Co. Aud.
Mass.,	Boston	Noon, Oct. 20.	8,600 ft. and 10,100 ft. of highways	Mass. Highway Com.
Ill.,	Galesburg	4 p.m., Oct. 20.	Brick pavement	Bd. Local Imps.
Cal.,	Oakland	10 a.m., Oct. 26.	Paving	John P. Cook, Clk. Bd. Alameda Co. Supvrs.
			SEWERAGE	
Ia.,	Council Bluffs	8 p.m., Oct. 19.	Vitrified pipe sewers, wyes and house connections	Chas. J. Duff, City Clk.
Pa.,	Franklin	4 p.m., Oct. 23.	Sewer construction	J. G. Crawford, City Clk.
N. Y.,	Schenectady	2.30 p.m., Oct. 26.	Two miles sanitary sewer	Schenectady Co. Sewer Comrs., Parker Bldg.
Kan.,	Ft. Scott	1 p.m., Oct. 27.	Sewage purification plant and outlets	Chas. O. Tallman, Com. Sts. & Pub. Imps.
			WATER SUPPLY	
Fla.,	Pensacola	Noon, Oct. 23.	Reconstructing walls and roofs of reservoirs	L. E. Thornton, City Eng.
W. Va.,	Wheeling	Oct. 26.	Two 60 H.P. water turbines and two 50 cu. ft. air compressors	U. S. Engr., Wheeling.
			LIGHTING AND POWER	
Kan.,	Topeka	10 a.m., Oct. 30.	Wiring for Capitol Building	Chas. H. Chandler, State Arch.
			FIRE EQUIPMENT	
Wash.,	Everett	10 a.m., Oct. 26.	Motor driven city service hook and ladder; truck, 40-gallon chemical tank and electric lighting	Louis Lesh, City Clk.

STREETS AND ROADS

Marysville, Cal.—Yuba County Supervisors have adopted resolution urging that lateral to State highway be built from Nevada City to Marysville via Downieville.

Sacramento, Cal.—In a comprehensive and detailed report, following an independent check on the 271 miles of road to be constructed under proposed bond issue of $2,425,000 for good roads, Haviland & Tibbets, consulting engineers, have submitted report to the Sacramento County Highway Commission, approving proposed bond issue and plans of Highway Commission. Following is list of proposed roads: River Road, 37.77 miles; Marysville Road, 9.08 miles; Lower Stockton Road, 8.50 miles; Plymouth Road, 14.78 miles; Greenback Road, 8.82 miles; Riverside Road, 3.38 miles; Fair Oaks Road, 12.28 miles; New Hope Road, 7.64 miles; Grant Line Road, 13.06 miles; Winding Way, 5.21 miles; Grand Island West, 11.90 miles; Winding Way No. 2, 2.37 miles; Florin-Perkins Road, 3.33 miles; Coloma Road, 4.86 miles; Grand Island East, 16.90 miles; Thornton Road, 1.26 miles; Bruceville Road, 9.46 miles; Antelope Road, 7.84 miles; Green Valley Road, 4.64 miles; Greer Road, 2.82 miles; Hood-Franklin Road, 3.83 miles; Pioneer Road, 2.78 miles; Florin-Elkgrove Road, 6.02 miles; Ryde-Howard Road, 2.34 miles; Elkgrove-Sheldon Road, 2.33 miles; Sutter Island Road, 6.02 miles; Fruit Ridge Road, 1.58 miles; Florin Road, 3.38 miles; Valley Oaks Road, 4.14 miles; Brannan Island Road, 3.88 miles; Twitchell Island Road, 1.50 miles; Sherman Island Road, 11.20 miles; Elder Creek Road, 2.43 miles; Clay Road, 9.56 miles; Cole's Ferry Road, 0.70 miles; Sheldon-Florin Road, 9.57 miles; Sheldon-Dilliard Road, 3.03 miles; Valensin Road, 5.17 miles; Elkgrove-Franklin Road, 3.33 miles; Jackson Slough, 1.50 miles; Del Paso Blvd., 1.43 miles.

Alton, Ill.—President A. K. Whitelaw of Wood River Village Board has given instructions to Village Engineer to proceed at once with making of estimates for paving of Whitelaw Ave. in Wood River which intersects Ferguson Ave., now paved. Mr. Whitelaw said that it is planned to pave street for distance of about three-quarters of a mile.

Indianapolis, Ind.—A resolution for paving Senate Ave., from Indiana Ave. to Tenth St., has been adopted by Board of Public Works. Estimated cost is $30,521.74.

Shelbyville, Ind.—Bids will be received until 10 a. m., Oct. 21, by W. A. McDonald, Treasurer, for purchase of $9,960 road improvement bonds.

Hutchinson, Kan.—A new road is to be built in Carey Park which will make automobile drive several miles longer than at present.

Lincoln, Mo.—See "Bridges."

Mocksville, N. C.—Board of Commissioners of Davie County has succeeded in closing satisfactory deal with Sidney Spitzer & Co., Toledo, O., for $40,000 good road bonds. This issue will be sufficient to continue road building for quite awhile.

Wilmington, N. C.—Councilman Merritt has stated the need of resurfacing some of the macadam streets in city, and after some discussion of proposition he was authorized by Council to purchase 10,000 gallon car load, which, it is estimated, will be sufficent to treat 20 or 30 additional blocks.

Newark, O.—Resolution has been adopted declaring it necessary to improve Clarendon St. from Cedar St. to Buena Vista St. by constructing sanitary and drainage sewer therein.

Sandusky, O.—Bids will be received by Board of County Commissioners of Erie County, O., at their office in the Court House in the City of Sandusky until 12 o'clock noon on Nov. 9, 1914, for sale of Main Market and Inter-County Highway construction and improvement bonds of said county, with interest coupons attached, in aggregate amount of $30,000, said bonds being in consecutive numbers from one to sixty inclusive and of denomination of $500 each. H. M. Adams is Auditor.

Connellsville, Pa.—Road Supervisors of Dunbar Township will present petition to citizens of that township to have present road to Uniontown changed. Route is now by way of White school house, but proposed change would bring it to the hollow by way of Bute or Leisenring No. 2.

Williamsport, Pa.—Following ordinances have passed second and third reading: Ordinance No. 32, providing for paving of Church St., from Mulberry St. to Laurel; Ordinance No. 86, providing for paving of the southern portion of Diamond Sq.; Ordinance No. 84, providing for repaving of West Third St., between Pine and Hepburn St., passed third and final reading.

CONTRACTS AWARDED.

Sacramento, Cal.—Following county contracts have been awarded by Board: Santa Barbara, between Stony Creek and El Capital, 10.2 miles; C. H. Hudson, Los Angeles, $79,191.40; Kern, from southerly boundary to 2.3 miles from Rose Station, A. C. McLean Construction Co., San Francisco, $68,004; Humboldt, between Loleta and Beatrice, 4.3 miles, Elsmore & Jacobs, Eureka, $18,-777.80; Humboldt, from Shively to Jordan Creek, 3.7 miles, William Crowley and T. E. Cloney, $28,624.98; Imperial, between Meyers Creek and Coyote Wells, 6 miles, J. W. Calback, San Diego, $68,-145.90; Alameda, from easterly boundary to Altamount, 5.9 miles, Palmer & McBryde, $38,032.

Alton, Ill.—Contract for paving of Easton St. has been awarded to Stafford & Miller by Board of Local Improvements. Following is list of bids. Prices given on paving are per square yard and on combined curb and guttering per lineal foot; David Ryan, paving, $1.68; curb and gutter, 45 cts.; Stafford & Miller, paving, $1.63; curb and gutter, 48 cts.; C. H. Degenhardt, paving, $1.81; curb and gutter, 55 cts.; Mulville Bros., paving, $1.68¾; curb and gutter, 55 cts.; John Struble, paving, $1.65; curb and gutter, 55 cts.

Sacramento, Cal.—For improvement of 15th St. to F. E. Frey, Sacramento, at following bid: Per lin. ft. of concrete curb and gutter combined, 58 cts.; per lin. ft. of concrete curb alone, 30 cts.; per concrete catch basin complete with cast iron curb and cover, $27; per cast iron gutter drain with 6-in. vitrified iron stone sewer pipe elbow attached, $4.50; per lin. ft. of 6-in. vitrified iron stone sewer pipe in place, 25 cts.; per lin. ft. of 8-in. vitrified iron stone sewer pipe in place, 30 cts.

Lafayette, Ind.—By County Commissioners contract for two free gravel roads. The Trieda Road in Washington Township went to O'Connor Bros. for $7,627; Mahoney Bros. were next to successful bidders with bid of $8,247. Booth Road in same township went to Mr. Palmer for $4,745.

Laporte, Ind.—County Commissioners have let contract for building of C. C. McLane Road in Noble Township to Louis Martine. Road is ¾ mile long and extends from Union Mills north to township line. Contract for August Zable Road in Cass Township has been let to George M. Gross Co.

Lawrenceburg, Ind.—County Commissioners have granted contract for constructing cement pike from Ohio and Indiana state line to corporation line of Greendale, a suburb of this city, for $30,500, to Nugent & Hines, road contractors, of Hamilton County, O.

Paducah, Ky.—Contract for repairing South Sixth St. culvert has been awarded to Contractor G. W. Katterjohn, Paducah, upon receipt of bids by Board of Public Works. Bids were: Brick—Yancy & Johnson, $1,785; G. W. Katterjohn, $1,481; reinforced concrete, Yancy & Johnson, $1,783.50; G. W. Katterjohn, $1,555.

Annapolis, Md.—For laying of concrete sidewalk along new Camp Parole Road for 3,000 ft. has been awarded to Frank M. Duvall, St. Margaret, Md., at $1.33 per sq. yd.

Holyoke, Mass.—Cabot St. will now be paved on south side as proposition of P. J. Kennedy, Inc., Holyoke, to lay city's blocks on street at $2.20 a sq. yd., has been accepted by Board of Public Works, and he was also authorized to use additional blocks at price of $2.38 a sq. yd.

Lowell, Mass.—Contract for 250,000 paving blocks more or less, has been awarded to Hildreth Granite Co. of Graniteville. Commissioner Morse called for two sizes 6 to 12 ins. and 8 to 12 ins. There were only two bidders, the Hildreth Co. and L. P. Palmer. Bids were as follows: Hildreth Granite Co., on 6 to 12-in. blocks, $37 a thousand; 8 to 12-in., $48 a thousand. L. P. Palmer, 6 to 12-in., $38 a thousand, and 8 to 12-in., $43.50 a thousand.

Paterson, N. Y.—Road committee of Passaic County Board of Freeholders has recommended that contract awarded to John T. Harrop Co., of Garfield, for asphalt macadam on Totowa Ave., Paterson, be altered to provide for drain, price to be paid being cost of work 15 per cent., and that director be authorized to draw supplementary contract. Committee on roads also recommended that contract for replanking Weasel bridge with creosote planking be awarded to Geo. W. Mead, who was lowest bidder provided Bergen County Board agrees to pay one-half the cost. This was approved.

SEWERAGE

St. Augustine, Fla.—The Perring Engineering Co. has reported that storm sewer proposed for Ribera St. will cost between $800 and $900. Clerk has been instructed to advertise for bids for laying the same.

La Salle, Ill.—Owing to technical irregularity in ballot forms, new election is necessary in matter of issuance of $40,000 bonds for new north side sewer extension and also $15,000 bond issue for new city well. Date of this election on both issues has been set for Thursday, Nov. 5, 1914.

Saginaw, Mich.—Ordinance has been passed authorizing issue of $5,000 sewer east bonds.

Billings, Mont.—Resolution for sewer district between North 30th and North 31st St. and Ninth and Tenth Aves. north has been passed. Work will cost about $850. Bids will be received Nov. 3.

Southport, N. C.—It has been decided unanimously that town prepare to install up-to-date water and sewerage system. Plan is to issue bonds to pay for same.

Dayton, O.—Commission has authorized issuance of bonds in sum of $10,000 for garbage disposal plant.

Delaware, O.—Ordinances have been adopted for construction of sanitary sewers in various streets.

Salem, O.—Ordinance appropriating $500 for purpose of making connections which will divert much of sanitary sewage of city into new intercepting sanitary sewer and conduct it to disposal plant rather than into county ditch has been presented and passed.

Youngstown, O.—Resolution has been adopted for construction of sewer in Fairmount Ave.

Downington, Pa.—Downington Council is considering building of $75,000 sewerage system and disposal plant.

Dallas, Tex.—Final specifications for municipal sewage disposal plant have been received by Mayor W. M. Holland and Commissioner R. R. Nelms from New York office of James H. Fuertes, expert, who designed the plant. Bids probably will be asked at once on two of the seven units of the system. First work on which bids will be called are two large interceptor sewers in Oak Cliff.

CONTRACTS AWARDED.

Billings, Mont.—Frank Savarsey, with bid of $8,886, has been awarded contract for installation of sewers in district between Minnesota and Fifth Aves. south and South 23d and South 27th Sts. T. F. Odegard's bid of $1,743.40 secured contract for installation of sewers between Miles and Howard Aves., and Montana and Fourth Aves. north.

Lewistown, Mont.—L. W. Schruth, Fargo, N. D., was found to be lowest bidder on construction of four sewers. Cost of one for Park addition is between $10,000 and $11,000, all others being small ones.

Plainfield, N. J.—To Contractor Edward L. Bader and Atlantic Construction Co., both of Atlantic City, contract for sewerage pipe and disposal works at $150,000 and $100,000 respectively. Contract calls for building of sewerage system over three miles in length, taking in Plainfield Borough, and City of Plainfield proper. An immense disposal plant is also included.

WATER SUPPLY

Ottawa, Ill.—Petition has been filed in county clerk's office by H. M. Kelly, representing number of property holders of Earlville, asking for establishment of system of water works in that city. Plan provides for expenditures of $14,000 to be paid for by special assessment. At present time city of Earlville has very little fire protection.

Gloucester, Mass.—Petition has been presented to Municipal Council by Horace Woodbury and 25 others, residents of Washington St., at Lanesville, asking for extension of deep water service to Folly Cove section, which was referred to Water Commissioners with approval of Municipal Council.

Bellmore, L. I., N. Y.—The Bellmore Citizens Water Co., Inc., has filed with State Conservation Commission complete set of plans for new water system at Bellmore. Plans show modern gravity